

AKAI

SERVICE MANUAL

Model:

LCT2701TD

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This manual is the latest at the time of printing, and does not include the modification which may be made after the printing, by the constant improvement of product.

I. Safety Instructions



CAUTION

**RISK OF ELECTRIC SHOCK
DO NOT OPEN**



CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL ONLY.



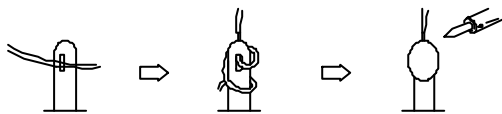
The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

PRECAUTIONS DURING SERVICING

1. In addition to safety, other parts and assemblies are specified for conformance with such regulations as those applying to spurious radiation. These must also be replaced only with specified replacements. Examples: RF converters, tuner units, antenna selection switches, RF cables, noise-blocking capacitors, noise-blocking filters, etc.
2. Use specified internal Wiring. Note especially:
 - 1) Wires covered with PVC tubing
 - 2) Double insulated wires
 - 3) High voltage leads
3. Use specified insulating materials for hazardous live parts. Note especially:
 - 1) Insulating Tape
 - 2) PVC tubing
 - 3) Spacers (insulating barriers)
 - 4) Insulating sheets for transistors
 - 5) Plastic screws for fixing micro switches
4. When replacing AC primary side components (transformers, power cords, noise blocking capacitors, etc.), wrap ends of wires securely about the terminals before soldering.



5. Make sure that wires do not contact heat generating parts (heat sinks, oxide metal film resistors, fusible resistors, etc.)
6. Check if replaced wires do not contact sharply edged or pointed parts.
7. Make sure that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

MAKE YOUR CONTRIBUTION TO PROTECT THE ENVIRONMENT

Used batteries with the ISO symbol for recycling as well as small accumulators (rechargeable batteries), mini-batteries (cells) and starter batteries should not be thrown into the garbage can. Please leave them at an appropriate depot.



WARNING:

Before servicing this TV receiver, read the X-RAY RADIATION PRECAUTION, SAFETY INSTRUCTION and PRODUCT SAFETY NOTICE.

X-RAY RADIATION PRECAUTION

1. Excessively high can produce potentially hazardous X-RAY RADIATION. To avoid such hazards, the high voltage must not exceed the specified limit. The normal value of the high voltage of this TV receiver is 27 KV at zero beam current (minimum brightness). The high voltage must not exceed 30 KV under any circumstances. Each time when a receiver requires servicing, the high voltage should be checked. The reading of the high voltage is recommended to be recorded as a part of the service record. It is important to use an accurate and reliable high voltage meter.
2. The only source of X-RAY RADIATION in this TV receiver is the picture tube. For continued X-RAY RADIATION protection, the replacement tube must be exactly the same type as specified in the parts list.
3. Some parts in this TV receiver have special safety related characteristics for X-RADIATION protection. For continued safety, the parts replacement should be under taken only after referring the PRODUCT SAFETY NOTICE.

SAFETY INSTRUCTION

The service should not be attempted by anyone unfamiliar with the necessary instructions on this TV receiver. The following are the necessary instructions to be observed before servicing.

1. An isolation transformer should be connected in the power line between the receiver and the AC line when a service is performed on the primary of the converter transformer of the set.
2. Comply with all caution and safety related provided on the back of the cabinet, inside the cabinet, on the chassis or picture tube.
3. To avoid a shock hazard, always discharge the picture tube's anode to the chassis ground before removing the anode cap.

4. Completely discharge the high potential voltage of the picture tube before handling. The picture tube is a vacuum and if broken, the glass will explode.
5. When replacing a MAIN PCB in the cabinet, always be certain that all protective are installed properly such as control knobs, adjustment covers or shields, barriers, isolation resistor networks etc.
6. When servicing is required, observe the original lead dressing. Extra precaution should be given to assure correct lead dressing in the high voltage area.
7. Keep wires away from high voltage or high temperature components.
8. Before returning the set to the customer, always perform an AC leakage current check on the exposed metallic parts of the cabinet, such as antennas, terminals, screwheads, metal overlay, control shafts, etc., to be sure the set is safe to operate without danger of electrical shock. Plug the AC line cord directly to the AC outlet (do not use a line isolation transformer during this check). Use an AC voltmeter having 5K ohms volt sensitivity or more in the following manner.

Connect a 1.5K ohm 10 watt resistor paralleled by a 0.15 μ F AC type capacitor, between a good earth ground (water pipe, conductor etc.,) and the exposed metallic parts, one at a time.


Measure the AC voltage across the combination of the 1.5K ohm resistor and 0.15 uF capacitor. Reverse the AC plug at the AC outlet and repeat the AC voltage measurements for each exposed metallic part.

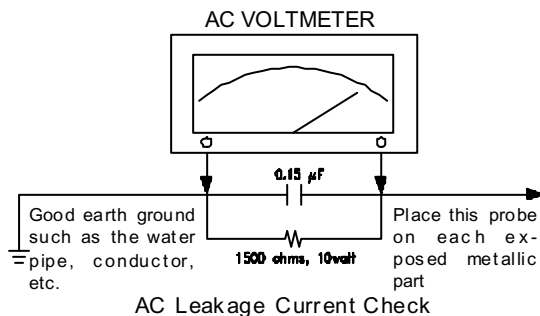
The measured voltage must not exceed 0.3V RMS.

This corresponds to 0.5mA AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected immediately.

The resistance measurement should be done between accessible exposed metal parts and power cord plug prongs with the power switch "ON". The resistance should be more than 6M ohms.

PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in this TV receiver have special safety-related characteristics. These characteristics are offer passed unnoticed by visual spection and the protection afforded by them cannot necessarily be obtained by using replacement components rates for a higher voltage, wattage, etc. The replacement parts which have these special safety characteristics are identified by  marks on the schematic diagram and on the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts which do not have the same safety characteristics as specified in the parts list may create shock, fire, X-RAY RADIATION or other hazards.



Product Specification

1.1 VIDEO SECTION	CHIMEI V270B1-L01 MK8205 USA
Display size	27"/16:9
Display Resolution	1366 X 768
Pixel Pitch	0.1460mm×0.4365mm
Peak Brightness	550(nits)
Contract Ratio	1000:1, Typical (1/100 White Window, Dark Room)
View Angle	Hor. And Vert. 170 degree
Color Deep	16.7M Color (R / G/ B each 256 Scales)
PC Resolution Supporting	VGA, SVGA, XGA, WXGA
HDTV Compatible	480i / 480p / 720p / 1080i
Progressive Scanning	Yes
Film Mode Pull Down	Yes
“GAMMA” Correction	Yes
Color Temperature Control	Yes
Comb Filter	Yes
Second De-interlace for Sub picture	No
Wide Mode	Normal, Full, Wide 1, Wide 2, Wide 3, 4:3, No scale and Panoramic.
TV System	NTSC M
Dual Tuner System	No
AV Input Color System	PAL /NTSC
PIP	Basic mode (video on graphic mode,resolution 1024×768)
1.2 AUDIO SECTION	
Audio Output Power	6W×2 Max.(8 ohm)
Sound Effect	Spatial Effect and Surround
Tone Control	Yes
1.3 Input Terminals	D-Sub 15 Pin Type(Analog-RGB Input) ×1 D-Sub 9 Pin (RS-232) RF (F-type Input) ×1 Component Video-YPbPr ×1 RCA Terminals S-Video Input (Mini Din 4Pin) ×1 Video Input RCA Terminals Stereo Audio Input for YPbPr x 1 (3.5mm Phone Type) x 1
1.4 Output Terminals	Audio Output (RCA ; L&R Type) ×1
1.5 Others	
Closed Caption / V-Chip	Yes
Teletext No	
OSD Language	English, Français, Español

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Stereo Decode	MTS with SAP
Power Rating	AC 120 V, 60Hz
Power Consumption	200W

1.6 Support the Signal Mode



This machine can support the different from VGA signal mode in 7 kinds

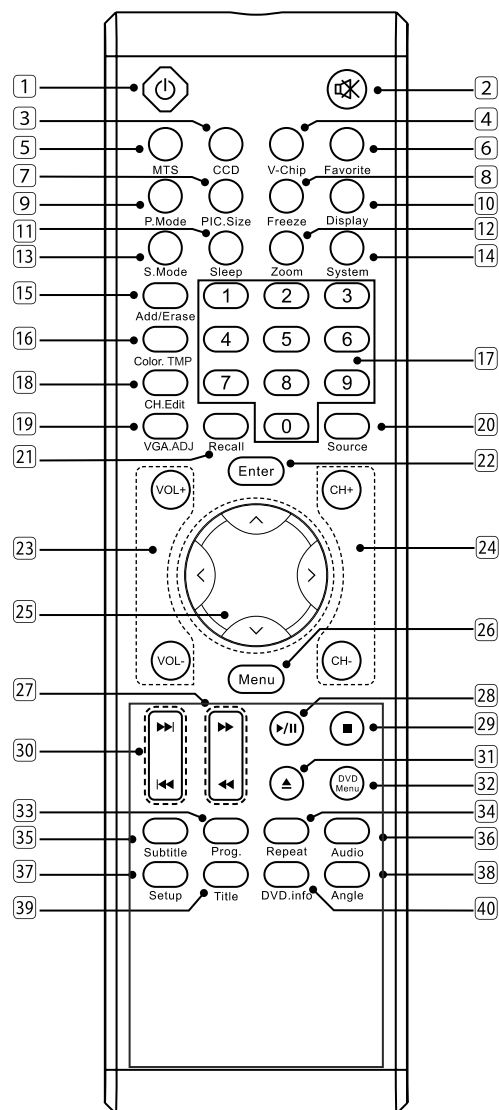
No	Resolution	Horizontal Frequency(Hz)	Vertical Frequency(KHz)	Dot Clock Frequency(MHz)
1)	640×480	31.50	60.00	25.18
2)	640×480	37.86	72.81	31.50
3)	800×600	35.16	56.25	36.00
4)	800×600	37.90	60.32	40.00
5)	800×600	46.90	75.00	49.50
6)	800×600	48.08	72.19	50.00
7)	1024×768	48.40	60.00	65.00

1.7 HDTV Mode (YPbPr)

No	Resolution	Horizontal Frequency(KHz)	Vertical Frequency(Hz)	Dot Clock Frequency(MHz)
1)	480i	15.734	59.94	13.50
2)	480p(720×480)	31.468	59.94	27.00
3)	720p(1280×720)	45.00	60.00	74.25
4)	1080i(1920×1080)	33.75	60.00	74.25

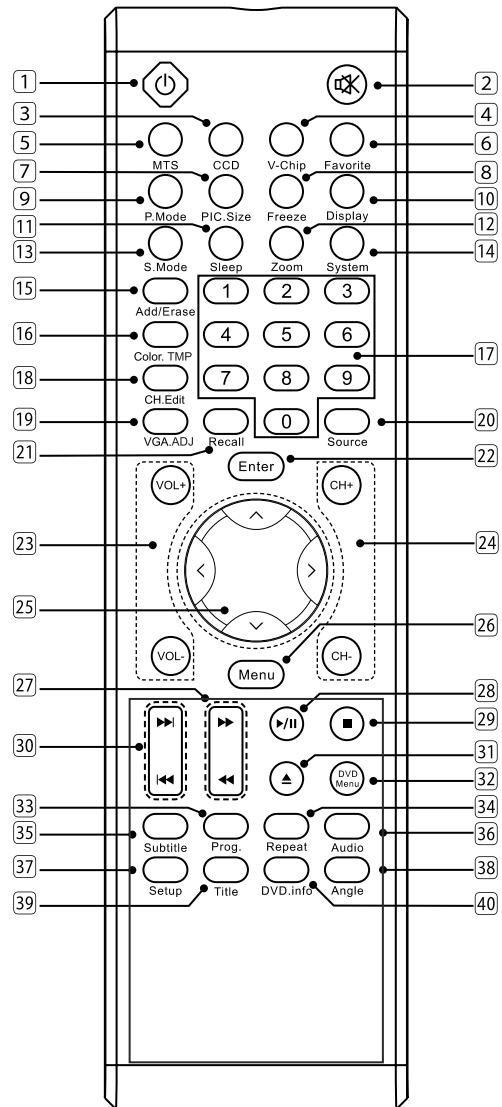
1.8 Remote Control

- 1 Power (): Press to turn on and off.
- 2 Mute (): Press to mute the sound. Press again or press VOL+/- to restore the sound.
- 3 CCD: Press to select the Closed Caption mode.
- 4 V-Chip: Press to select the child protect mode.
- 5 MTS: Press repeatedly to cycle through the Multi-channel TV sound (MTS) options: Mono, Stereo and SAP (Second Audio Program).
- 6 Favorite: Press repeatedly to cycle through the favorite channel list.
- 7 PIC.Size: Press repeatedly to cycle through the picture size that best corresponds your viewing requirements: Normal, Full, Wide1, Wide2, Wide3, 4:3, No scale, Panoramic and Normal.
- 8 Freeze: Press to freeze the picture, press again to restore the picture. (This button is not available for VGA mode.)
- 9 P.Mode: Press repeatedly to cycle through the picture mode: Hi-Bright, User, Dark, Normal and Vivid.
- 10 Display: Press to display the channel information and it disappear after 3 seconds.
- 11 Sleep: Press repeatedly until it displays the time in minutes (5 Min, 10 Min, 15 Min, 30 Min, 60 Min, 90 Min, 120 Min and, OFF) that you want the TV to remain on before shutting off. To cancel sleep time, press Sleep button repeatedly until sleep OFF appears.
- 12 Zoom: Press to zoom the image. (This button is not available for VGA mode.)
- 13 S.Mode: Press repeatedly to cycle through the sound mode: Normal, News, Cinema, Flat and User.
- 14 System: Press repeatedly to cycle through the system options: AUTO and NTSC3.58. (This button is activate for AV, S-Video input source.)
- 15 Add/Erase: Press to add or delete favorite channel.
- 16 Color TMP: Press to select the color temperature.
- 17 0~9 Number Buttons: In TV mode, press 0~9 to select a channel; the channel changes after 2 seconds. In DVD mode, press 0~9 to input the items.
- 18 CH Edit: Press to edit channel name.
- 19 VGA ADJ: Press to auto adjust VGA position.
- 20 Source: Press to select the signal source, such as TV, AV, S-Video, Component, DVD, or VGA.
- 21 Recall: Press to return previous channel.
- 22 Enter: To select an item, press Enter to confirm.
- 23 VOL + / - : Press to adjust the volume.
- 24 CH + / - : Press to scan through channels. To scan quickly through channels, press and hold down either channels.
- 25 <, ^, v, >: Press <, ^, v, > to move the on-screen cursor.



- 26 Menu: Press to enter on-screen setup menu, press again to exit.
- 27 ◀◀, ▶▶ : Press to search the backward forward.
- 28 ▶/|| : Press to play or pause the DVD disc.
- 29 ■ : Press to stop playing the disc.
- 30 ◀◀, ▶▶ : Press to skip the backward or forward.
- 31 ▲ : Press to open or close the disc tray.
- 32 DVD Menu: Press to return DVD disc menu.
- 33 Prog: Press to display the program menu. Press it again to exit.
- 34 Repeat: Press repeatedly to cycle through the options: CHAPTER, TITLE, ALL and nothing.
- 35 Subtitle: Press to select desired DVD subtitle.
- 36 Audio: Press to select desired audio track.
- 37 Setup: Press to display a menu. Press it again to exit menu.
- 38 Angle: Press to select desired viewing angle of the Video (disc feature).
- 39 Title: Press to display to DVD disc title.
- 40 DVD Info: Press to display DVD information.

Note: Press CH +/- on the remote control can turn on TV set from last preview mode.



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Technical Data

1. Power supply	TV	AC 120V, 60Hz
	Remote control	Battery 3V (UM-3/R6P/AA×2)
2. TV system	RF input	NTSC M
	Video input	PAL/NTSC 3.58/NTSC 4.43
3. Receiving channels	TV	VHF-L : 2~6CH VHF-H : 7~13CH UHF : 14~69CH
	CATV	1~125CH
4. Intermediate frequencies	Picture	45.75MHz
5. Scanning	Horizontal (Hz)	15625/15750
	Vertical (Hz)	50/60
6. AC plug		UL Plug
7. Panel		V270B1-L01
8. Speaker	Internal	8 ohm 6W (max) ×2
9. Operating temperature Accept	Fulfill all specifications	15 C ~ 30 C
	picture/sound reproduction	5 C ~ 33 C
10. Operating relative humidity Accept	Fulfill all specifications	45% ~ 75%
	picture/sound reproduction	20% ~ 80%
11. Electrical & optical specification		See the attachment 1.
12. Circuit diagram drawing No.		LCT2701TD
13. Cabinet		
14. Cabinet color		
15. Packing		1 set per
16. Container stuffing method		RD/05/P/LC26HAB/CSI/02 REV: 01
17. Dimension (mm) (No packing)	LCD-TV	698(W) x 513(H) x 99(D)mm (w/o Stand)
		698(W) x 554(H) x 250(D)mm (with Stand)
	Remote control unit	183(L) x 53(W) x 28(T)mm
18. Net weight	LCD-TV	13.9Kg (with Stand) approx
	Remote control	70g (approx)
19. Cell Defect		Subject to Panel supplier specification

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Attachment 1: Electrical & Optical Specification

No.	Items		Instruction		Typical	Limit	Unit
1	Video sensitivity		For 30dB S/N		44	≤ 51	dBuV
2	FM sound sensitivity		For 30dB S/N		21	≤ 35	dBuV
3	Color sensitivity		For RF transmission		37	≤ 40	dBuV
4	CCD sensitivity		TV screen refreshes 40 times number of mistakes ≤ 8		43	≤ 50	dBuV
5	Minimum NICAM threshold		Without crackline noise		N/A	N/A	dBuV
6	Stereo Channel Separation		BTSC.		18	≥ 15	dB
7	AGC static characteristic		Accept. Picture/Sound repr.		90	≥ 90	dBuV
8	Selectivity		Adjacent sound carrier		30	≥ 28	dB
			Below adjacent sound carrier		30	≥ 30	
			Adjacent picture carrier		45	≥ 40	
			Up adjacent picture carrier		40	≥ 30	
9	IF rejection				55	≥ 45	dB
10	Image rejection		VHF		57	≥ 45	dB
			UHF		55	≥ 40	
11	AFT pull-in range				± 1.0	$\geq \pm 1.0 $	MHz
12	Chroma sync pull-in range				± 500	$\geq \pm 200 $	Hz
13	Color killer function				-11	≤ -10	dB
14	Resolution	RF	Horizontal	PAL	300	≥ 300	Lines
				NTSC	260	≥ 240	Lines
			Vertical	PAL	410	≥ 400	Lines
				NTSC	320	≥ 300	Lines
		Video	Horizontal		450	≥ 450	Lines
			Vertical		400	≥ 400	Lines

15	Color Coordination	White	Xw	Full Pattern	0.295	0.295±0.02	
			Yw		0.300	0.300±0.02	
16	View Angle(Lo/3)	Horizontal			170	≥170	Degree
		Vertical					
17	Overscan			Cross hatch signal	96	94~98	%
18	Picture position			In all direction	±2	≤ ±3	mm
19	H sync pull-in range				±400	≥ ±200	Hz
20	V sync pull-in range				6	≥6	Hz
21	Audio frequency response			±3dB ref. to 1KHz	0.15~12	0.2~12	KHz

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22	Max Audio Output Power		7×2	≥5.0×2	W
23	Audio output power 10% THD	1KHz 10% THD	6×2	≥4.0×2	W
24	THD	Po=0.5W	0.5	≤3	%
25	Signal to buzz ratio	coeighting	50	≥30	dB
26	Minimum volume hum	coeighting	6	≤10	mVrms
27	Maximum woofer output power		N/A	N/A	W
28	Woofer audio frequency response	±3dB ref. to 15Hz AV mode	N/A	N/A	Hz
29	Tone low frequency	100Hz ref. to 1KHz AV mode	±8	≥ ±3	dB
30	Tone high frequency	10KHz ref. to 1KHz AV mode	±8	≥ ±3	dB
31	Balance	Center	0	≤ ±2	dB
		Max.	3	>2	
		Min.	-35	≤-30	

32	Video input level			1.0	1±0.3	Vpp
33	Audio input level*（1）			1.0 *	0.5±0.3	Vrms
34	Video output level			N/A	N/A	Vrms
35	Audio output level*（2）			0.3 *	0.5±0.3	Vrms
36	AV Audio input max. level			2	≤2	Vrms dB
37	AV Audio output L/R Separation			35	≥30	
38	Power consumption		Operating	200	≤200	W
			Stand by	3	≤5	W
39	IR receiving distance		0 Degree	7	≥6	m
40	IR receiving angle	left/right	5m	60	≥45	Degree
		Up/down		20	≥15	Degree
41	Dielectric strength		DC 3KV 1min.	5	≤10	mArms
42	The vibration noise from electromagnetic devices in LCD- TV set		The distance between the tester and the LCD-TV set is four times as many as the screen height	No obvious vibration noise can be heard		

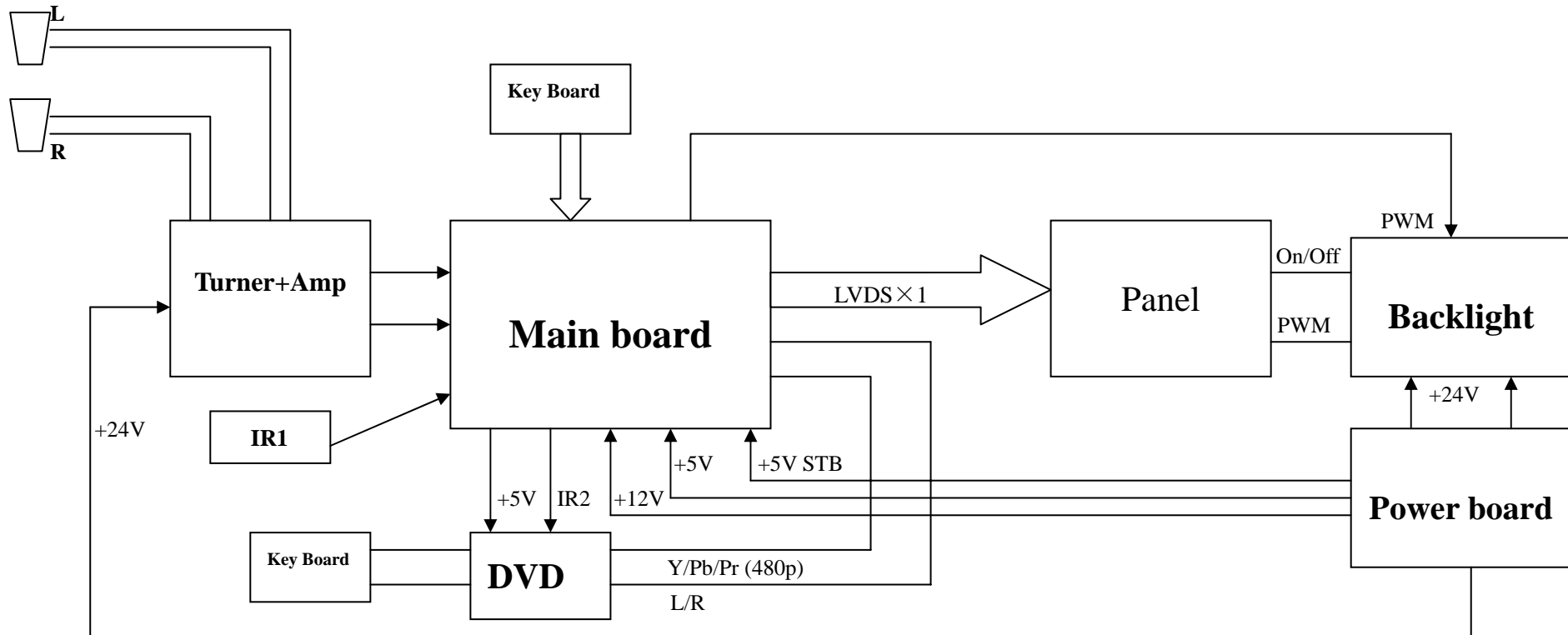
Test Condition**All tests shall be performed under the following conditions unless otherwise specified**

1	Picture Modulation	87.5%
2	Sound Modulation	27KHz Dev. For DK/I/BG 15KHz Dev. For M/N
3	Picture to Sound Ratio	10dB
4	Sound Artificial Load Resistor	8 ohm
5	Video signal	Stair and Special
6	Audio signal	1KHz sine wave 0.5Vrms
7	Other conditions: A. Switch LCD-TV on and let it warm up for more than 30 minutes. Viewing distance: 3H (H: Panel High) in front of LCD, about 2M. Ambient light: $\leq 0.1 \text{ cd/ m}^2$ B. Brightness, Contrast, Saturation, Tint, sharpness set at normal. C. Connect RMS volt meter to speaker terminals and adjust the LCD volume to get 500mW RMS power at each terminals. D. With image sticking protection of LCD module. The luminance will descend by time on a same still screen and rapidly go down in 5 minutes, when measuring the color tracking and luminance of a same still screen, be sure to accomplish the measurement in one minute to ensure its accuracy. E. Due to the structure of LCD module. The extra-high-bright same screen should not hold over 5 minutes for fear of branding on the panel. F. RF test point: Video output.	
8	Note: *(1) Now this project cannot fit the limited spec. the typical audio input level is 1.0 Vrms, *(2) The audio out level is controlled by the volume level, the range is from 0 to 0.5Vrms.	

DVD player's spec. For LCD-TV Combo

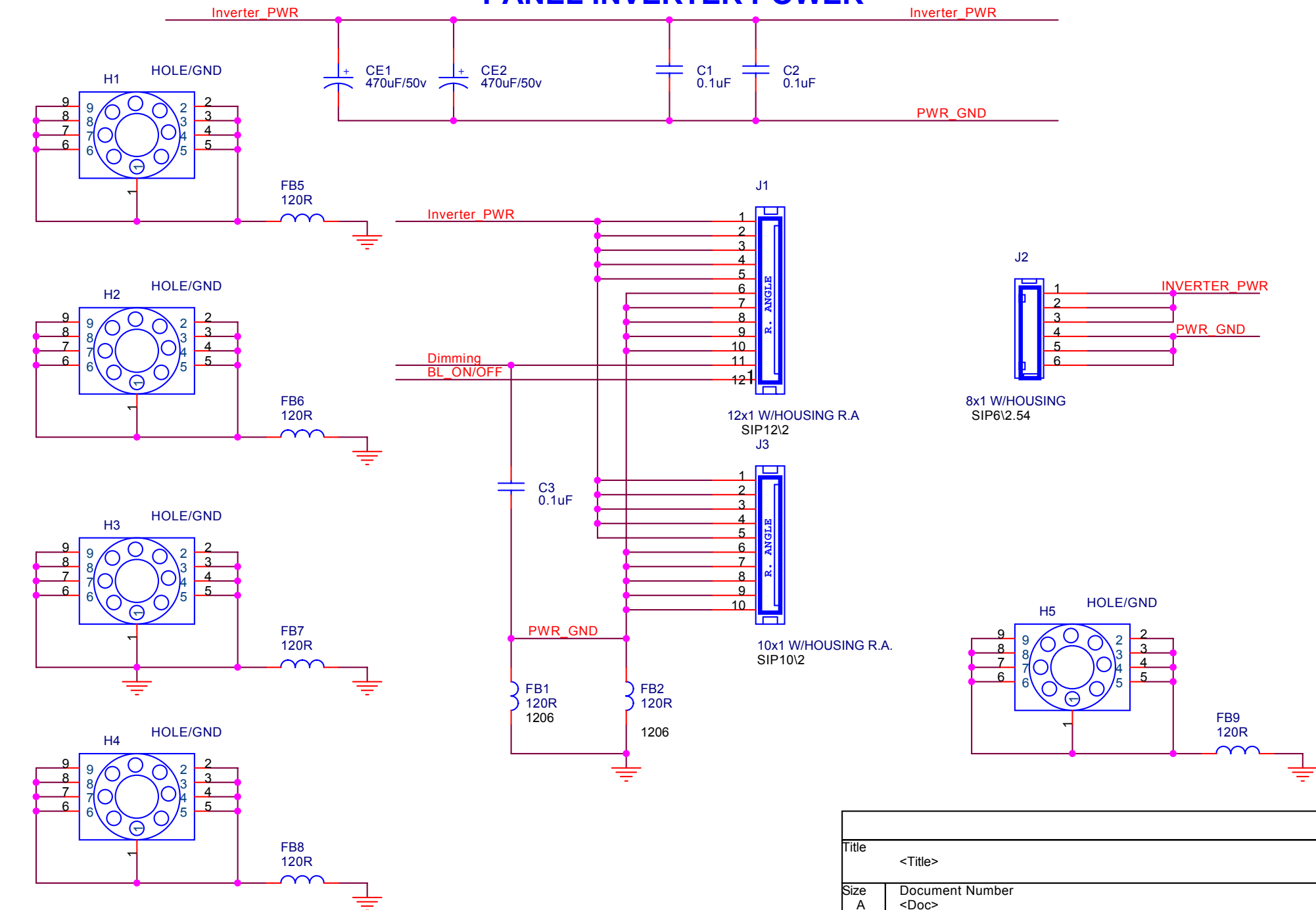
Division	Section	Remarks
General	name	AKAI
	Marketing Area(setup default language)	USA
	Power supply	+5v,+3.3v
	Power Consumption	15W
	Manufactruer of Loader mechanism	Foryou DL06-LS
DVD Module	Opitcal Pick UP	Sanyo HD-62/65
	Chipset used	MTK 1389FE
Playback Disc Type	Playable Media Type	Playable Disc Type: DVD, CD,
	Playable Disc Type	DVD(Single/ Dual layer, Double sided), CD
	Disc Size	8cm/12cm
	Regional code	Regional 1
	NTSC/ PAL Disc playback	O/O
Video	Video output signal	NTSC
	Video DAC	27MHz/ 10bit
Audio	Audio DAC	48Khz/ 96KHz/24-bit:selectable
	Dynamic range	Present
	Dolby digital decoder	Present
	DTS decoder	optional
	SRS + TruSurround for 2 channel	Not present
	3D Virtual surround for 2 channel	Not present
Playback Features	Fast forward/backward	x2,x4,x8,x16,x32
	Slow motion forward	x1/2,x1/4,x1/8,x1/16
	Slow motion backward	optional
	Still picture	Present
	Frame by frame forward/reverse	Forward only (Step function)
	Skip forward/reverse	Present
	Repeat function	Present
	DVD closed caption	Present
	Transition Effect for picture CD	Not present
	Rotation of picture for picture CDs	Present
	Last Memory	Present
Display user operation	Graphical user interface	Not present
	OSD Language	3 (ENG is base ,SPA and French)
	Subtitle	Present
	Screen saver	Present
	Resume play	Present
	Program function	Present
	PBC ON/OFF	Default on PCB
	Parental lock	Password : 0000
	Picture mode selector	16:9, 4:3 LB, 4:3 PS(4:3 PS as default)
	Intro scan	Not present
	Digest in VCD	Present, only for PIC CD
	Time search	Present
	Multi angle	Present
	Selectable audio language streams	Present
Front Panel	kalaoke function	x
	VFD/ LED	x
	No. of keys	3(Open/Close, Play, Stop)
Rear Panel	Composite Video output	x
	Component Video output	x
	Progressive scan output (480P)	Present
	2 channel audio output	Present
	Coaxial audio output	Present

LCD COMBO Connection

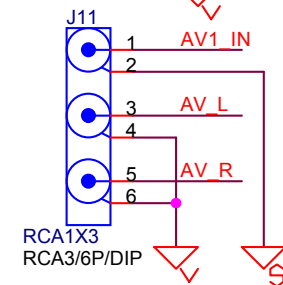
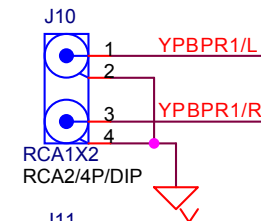
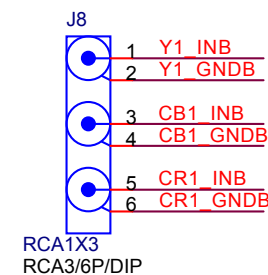
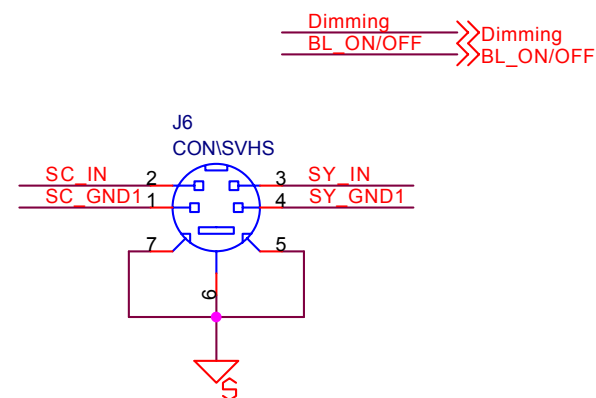
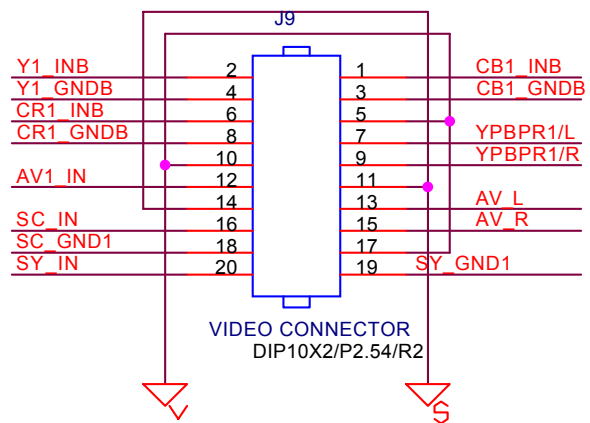
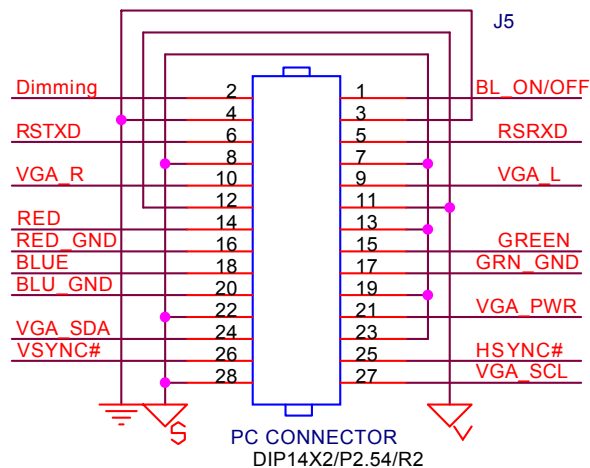
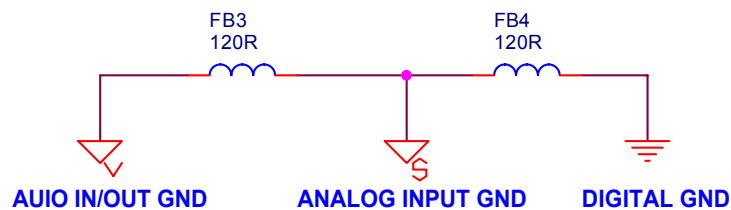
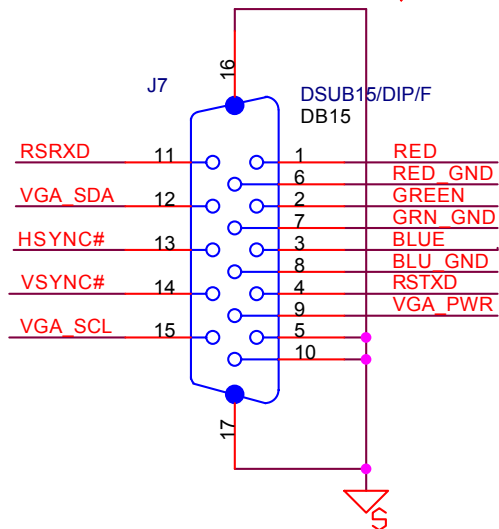
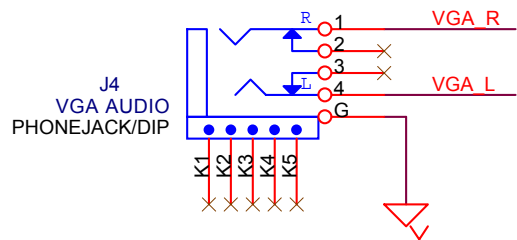


Dimming
BL_ON/OFF

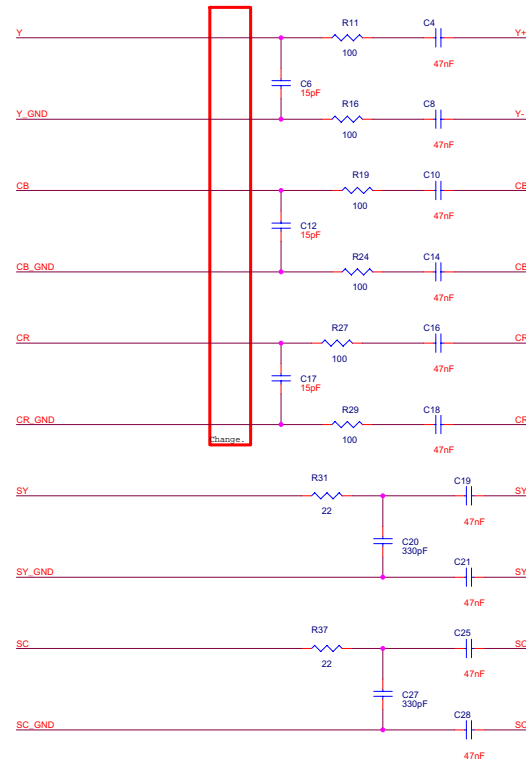
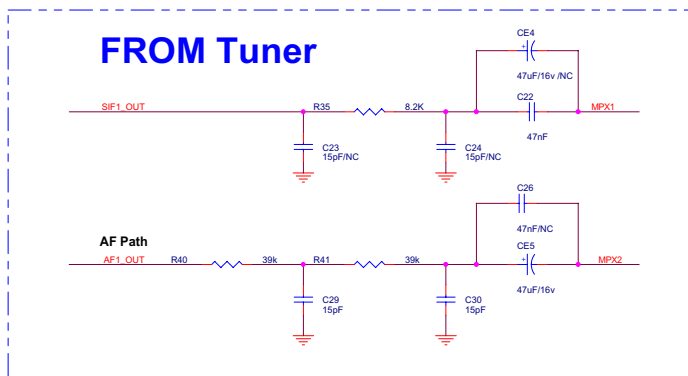
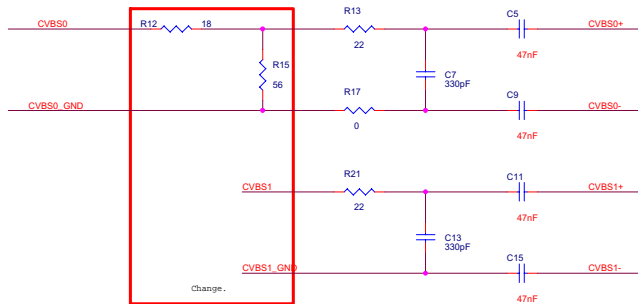
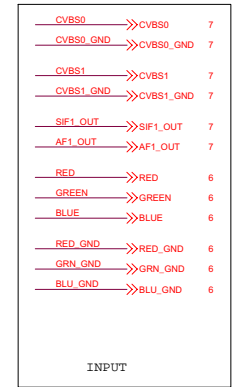
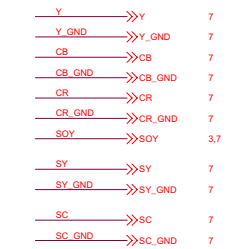
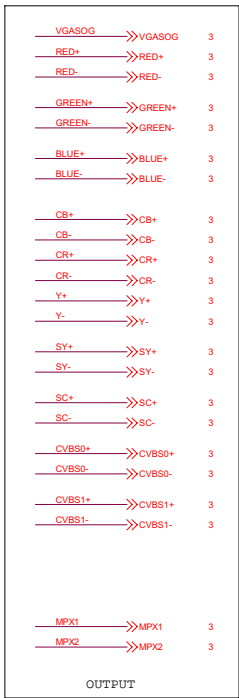
PANEL INVERTER POWER



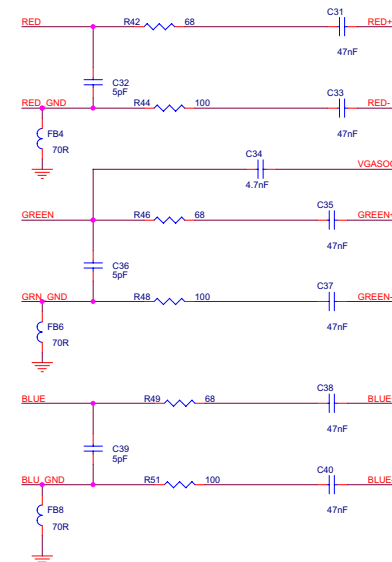
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Size A	Document Number <Doc>	Rev <RevCode>
Date:	Wednesday, August 24, 2005	Sheet 1 of 2



Title		
<Title>		
Size	Document Number	Rev
A	<Doc>	<RevCode>
Date:	Wednesday, August 24, 2005	Sheet 2 of 2



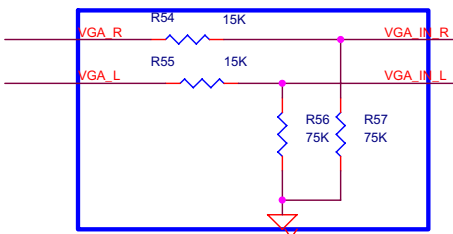
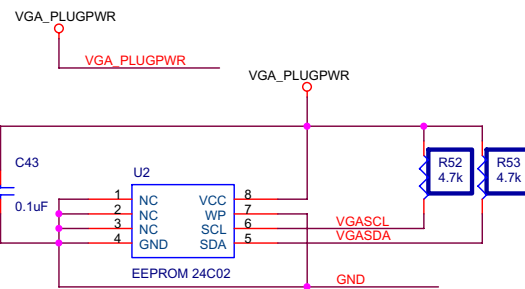
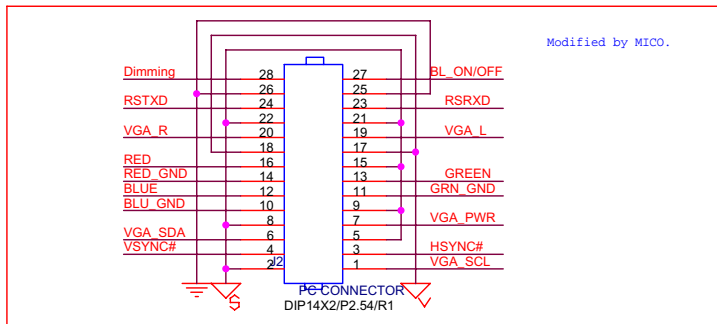
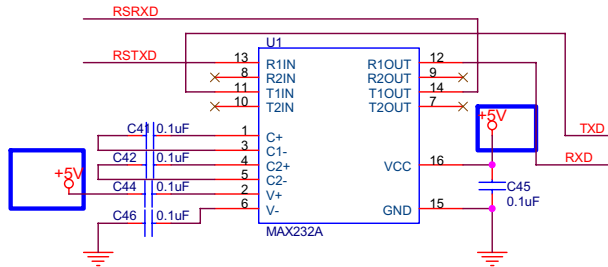
ATTENTION:WHEN PCB LAYOUT,MUST NEAR VGA INPUT PORT! BIN_WANG. 16/7/05



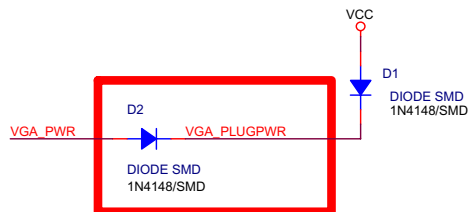
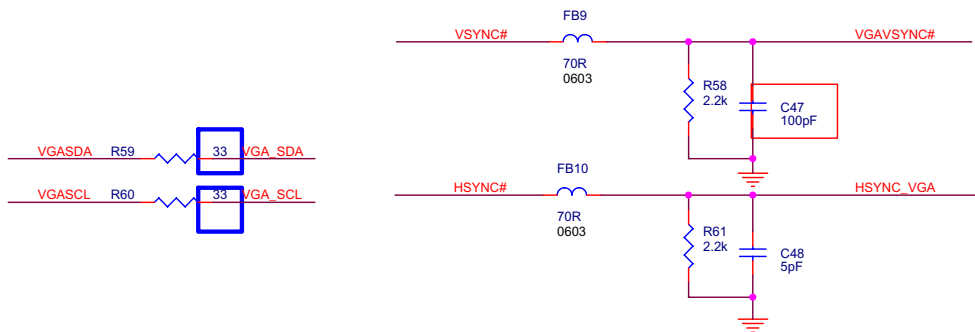
MODIFIED BY BIN_WANG 16/7/05.

MICO Confidential			
Title MICO LCD TV - MediaTek MT8203 Solution			
Size C	Doc Number AV IN	Rev V0.1	
Date: Thursday, September 15, 2005	Sheet 2	of 10	

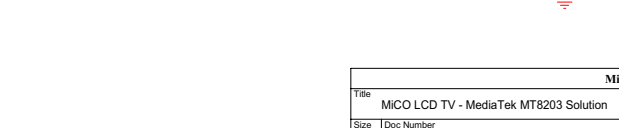
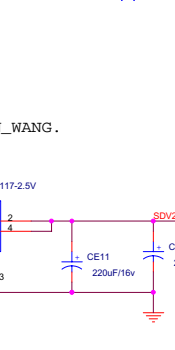
TXD >> TXD 3
 RXD >> RXD 3
 Dimming >> Dimming 9
 BL_ON/OFF >> BL_ON/OFF 9



VGA_IN_L >> VGA_IN_L 10
 VGA_IN_R >> VGA_IN_R 10
 VGASDA >> VGASDA 3
 VGASCL >> VGASCL 3
 HSYNC_VGA >> HSYNC_VGA 3
 VAVSYNC# >> VAVSYNC# 3
 RED_GND >> RED_GND 8
 GRN_GND >> GRN_GND 8
 BLU_GND >> BLU_GND 8
 RED >> RED 8
 GREEN >> GREEN 8
 BLUE >> BLUE 8



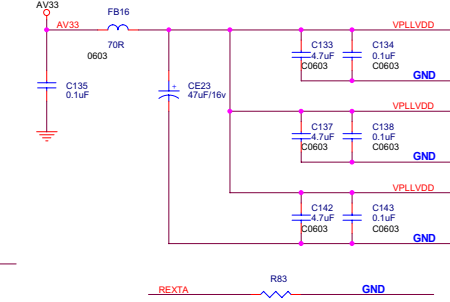
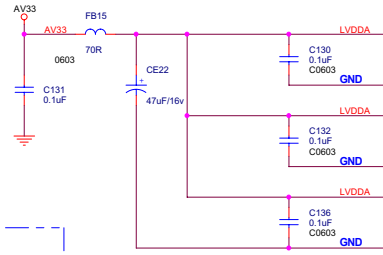
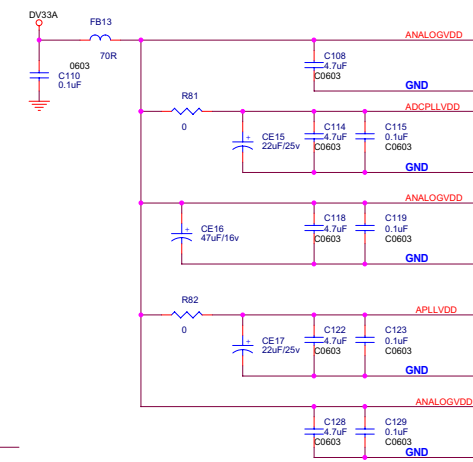
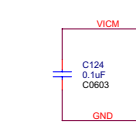
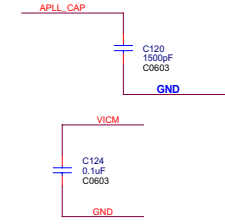
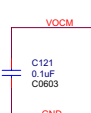
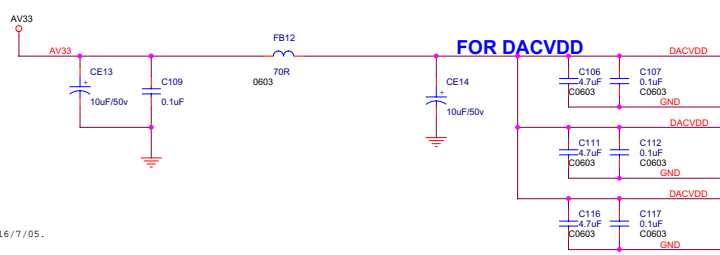
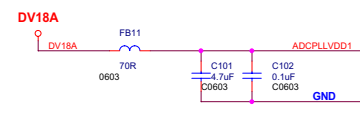
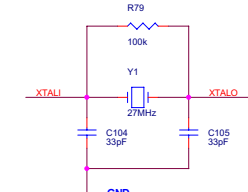
MiCO Confidential			
Title			
MiCO LCD TV - MediaTek MT8203 Solution			
Size	Doc Number	Rev	
B	VGA IN & PC AUDIO IN	V0.1	
Date:	Thursday, September 15, 2005	Sheet	3 of 10



MT8203 ANALOG&DIGITAL DECOUPLING

DACVREF	>>DACVREF	3
DACFS	>>DACFS	3
ADCPLLVD01	>>ADCPFS	3
ADCPLLVD0	>>ADCPFS	3
APLLVDD	>>APLLVDD	3
ANALOGVDD	>>ANALOGVDD	3
VPLLVD	>>VPLLVD	3
LVDDA	>>LVDDA	3
ADCVD0	>>ADCVD0	3
ADCVD0	>>ADCVD0	3
AVCM	>>AVCM	3
VOCM	>>VOCM	3
VICM	>>VICM	3
VREFP4	>>VREFP4	3
VREFN4	>>VREFN4	3
ADCVD00	>>ADCVD00	3
PWM2VREF	>>PWM2VREF	3
AUXTOP	>>AUXTOP	3
AUXBOTTOM	>>AUXBOTTOM	3
REXTA	>>REXTA	3
APLL_CAP	>>APLL_CAP	3
XTALI	>>XTALI	3
XTALO	>>XTALO	3
ADCVD04	>>ADCVD04	3

ADDED BASE ON P1V5 COMMON BOARD BY BIN_WANG 16/7/05.



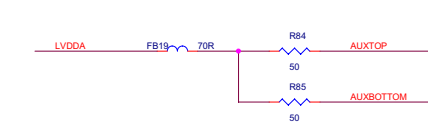
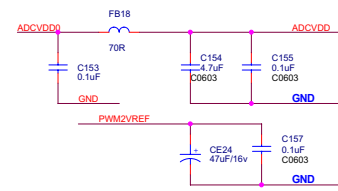
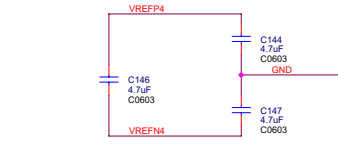
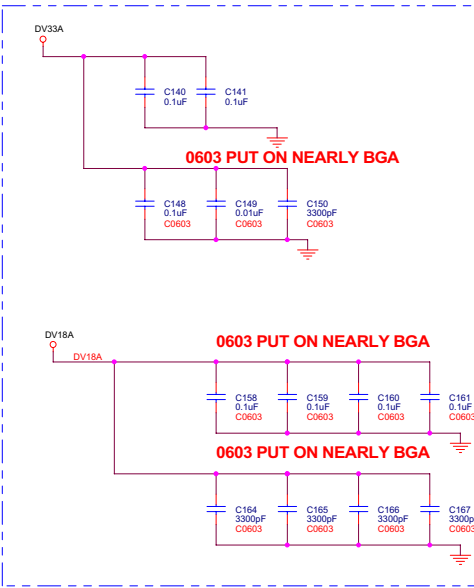
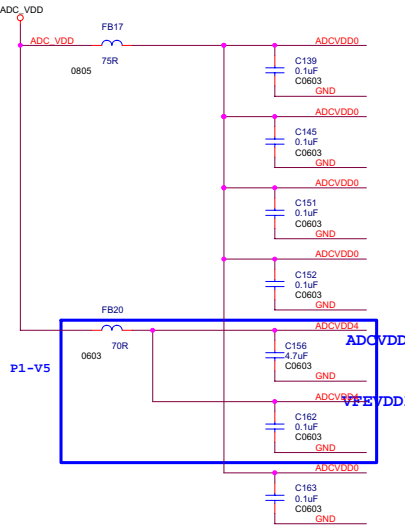
FOR ADCVDD

Note for Fix or Adj Regulator

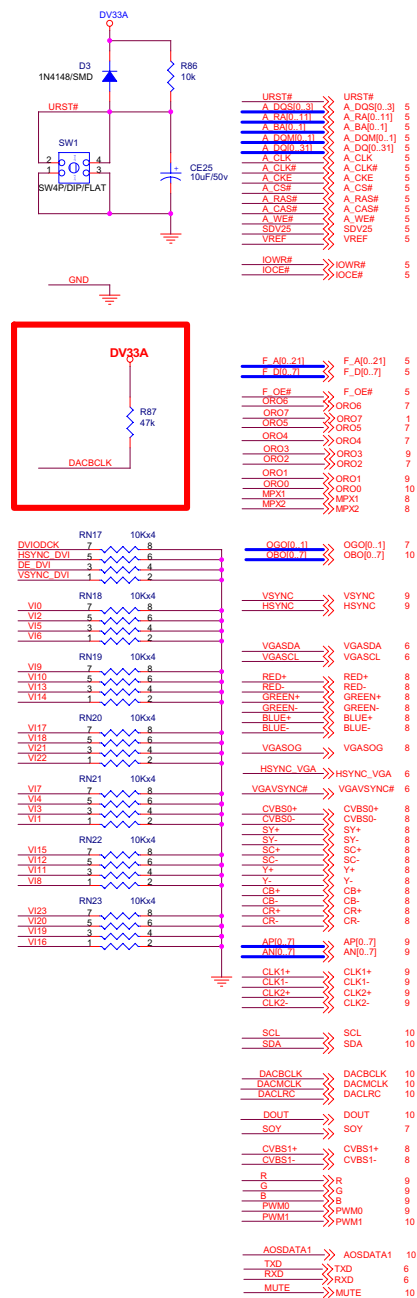
AZ1117	Rdown	Rup
Fix regulator	0 ohm	OFF
Adj regulator	180 1%	110 1%

1.25x(1+Rdown/Rup)

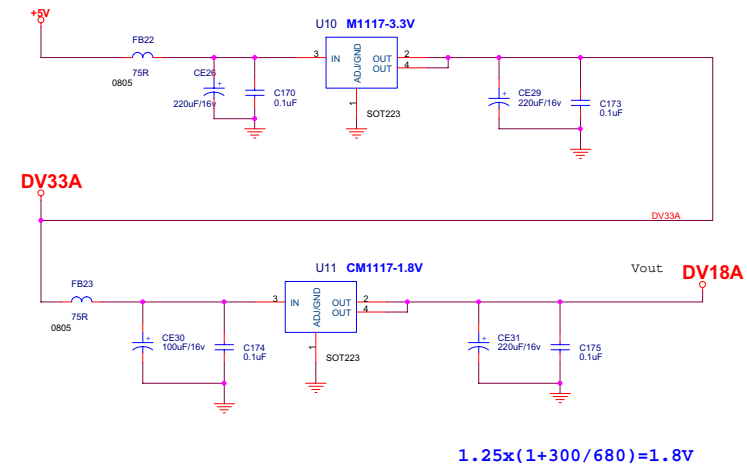
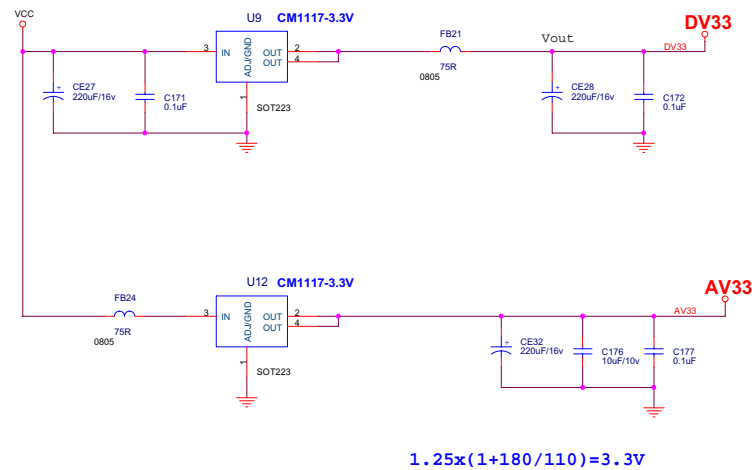
1.25x(1+180/110)=3.3V



MICO Confidential			
Title	MICO LCD TV - MediaTek MT8203 Solution		
Size	Doc Number	MT8203 ANALOG&DIGIT DECOUPLE	Rev V0.1
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Power ON alive source



MICO Confidential			
Title: MiCO LCD TV - MediaTek MT8203 Solution			
Size: C	Doc Number: LDO		Rev: V0.1
Date: Thursday, September 15, 2005	Sheet: 7	of 10	

MT8203E (PBGA388) LCDTV BOARD 4 LAYERS

01.INDEX & POWER CONNECTOR

02. LDO

03.MT8203 PBGA 388

04.MT8203 ANALOG&DIGIT DECOUPLE

05.DDR MEMORY & FLASH

06.VGA IN & PC AUDIO IN

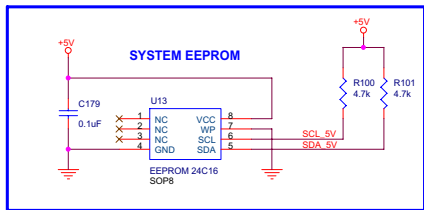
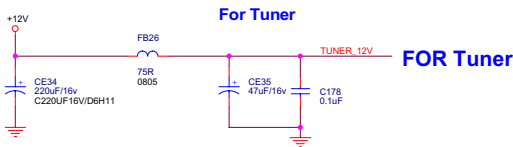
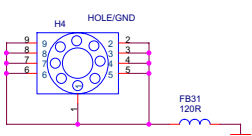
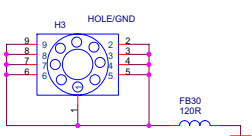
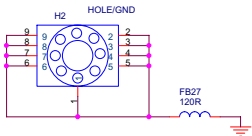
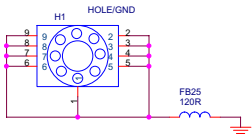
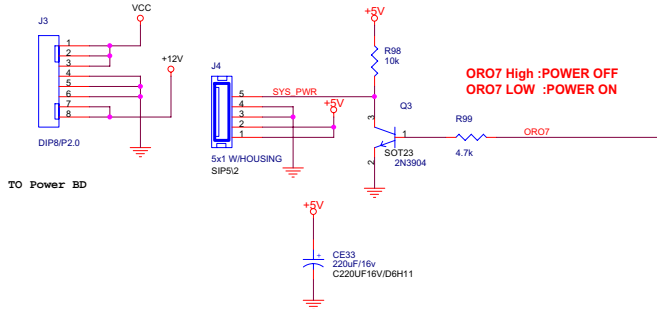
07.VIDEO IN & TUNER IO

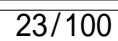
08. AV IN

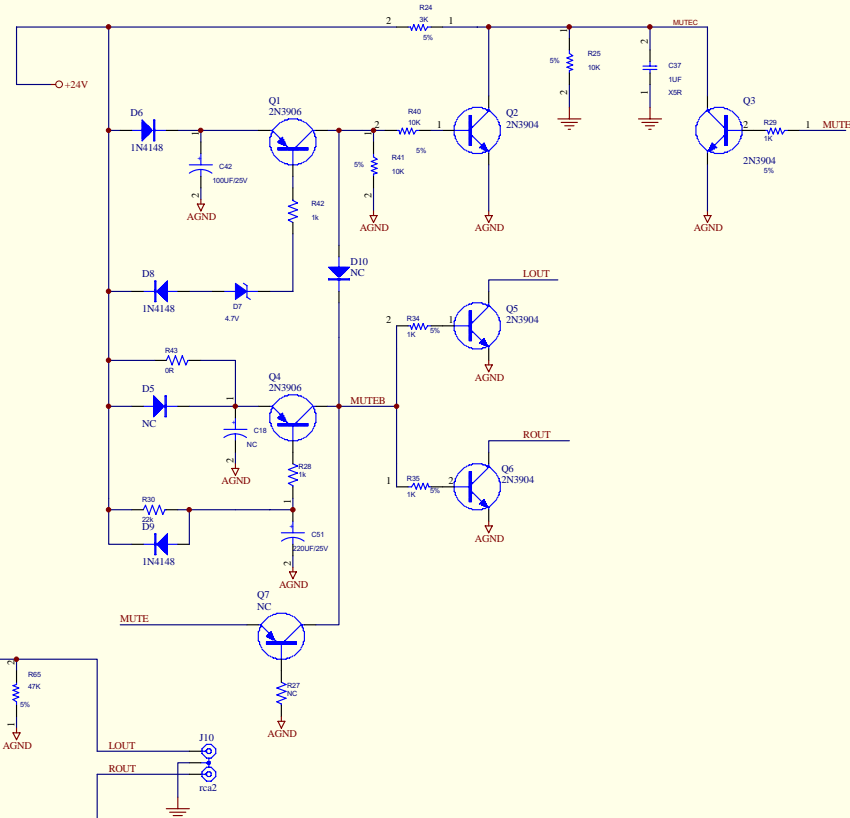
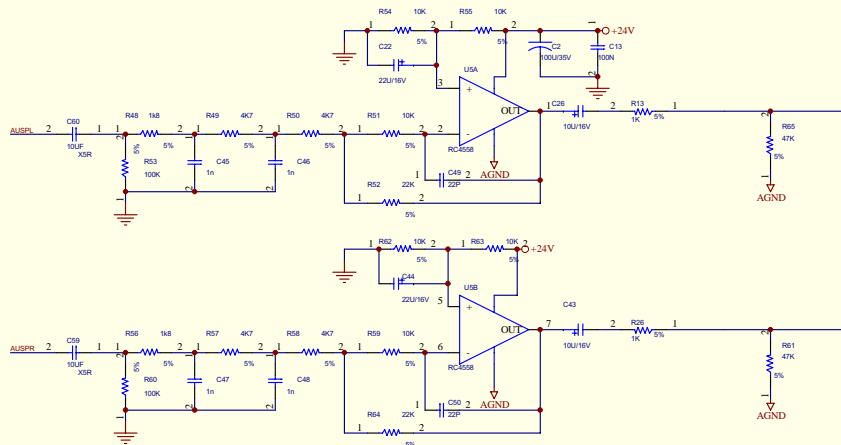
09.LVDS/CRT/BACK LIGHT CONTROL

10.AUDIO WM8776/ KEYPAD

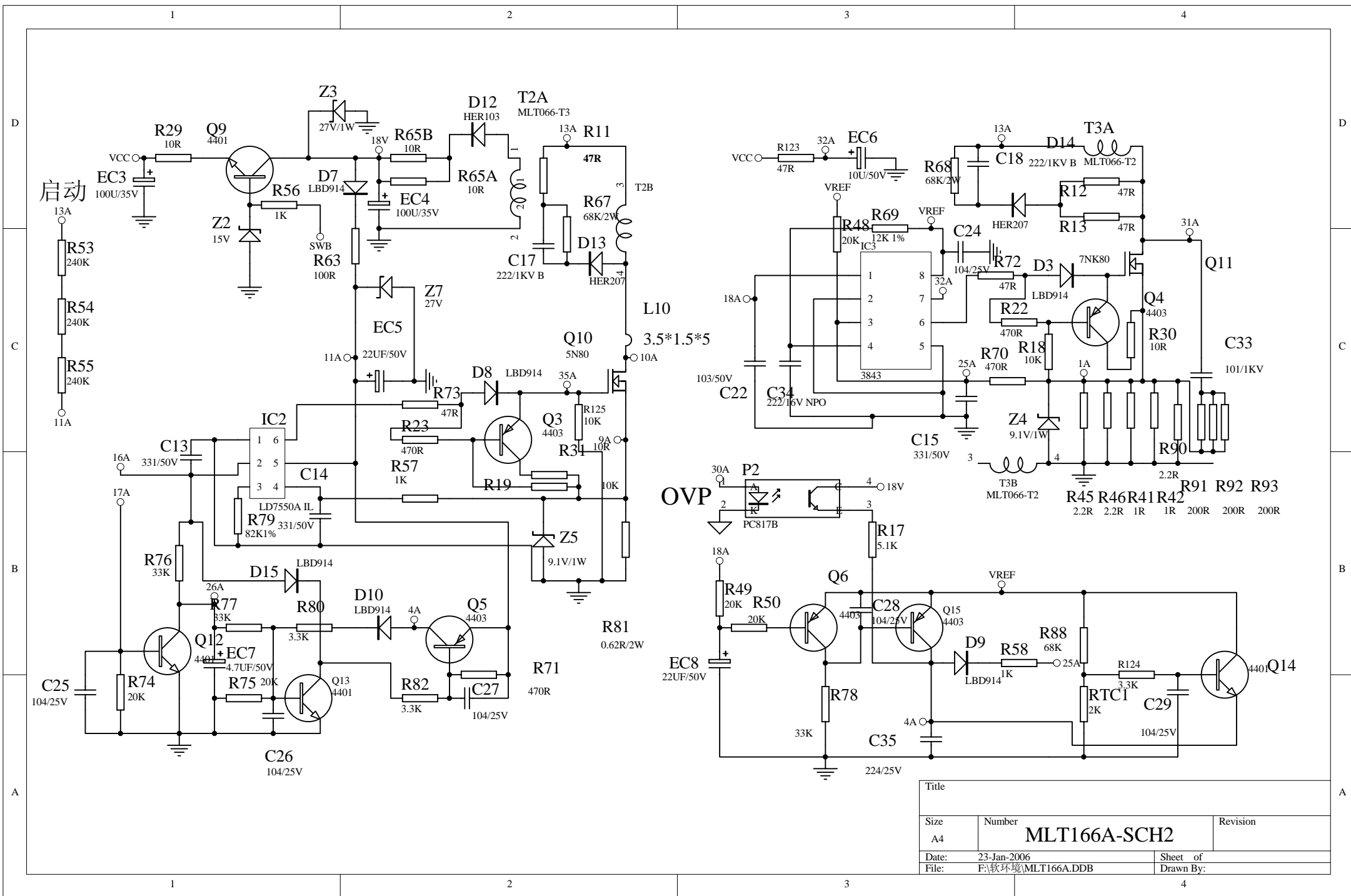
TXD	TXD	3,6
RXD	RXD	3,6
SCL_5V	SCL_5V	7,10
SDA_5V	SDA_5V	7,10
+12V	+12V	9
TUNER_12V	TUNER_12V	7
OR07	OR07	3

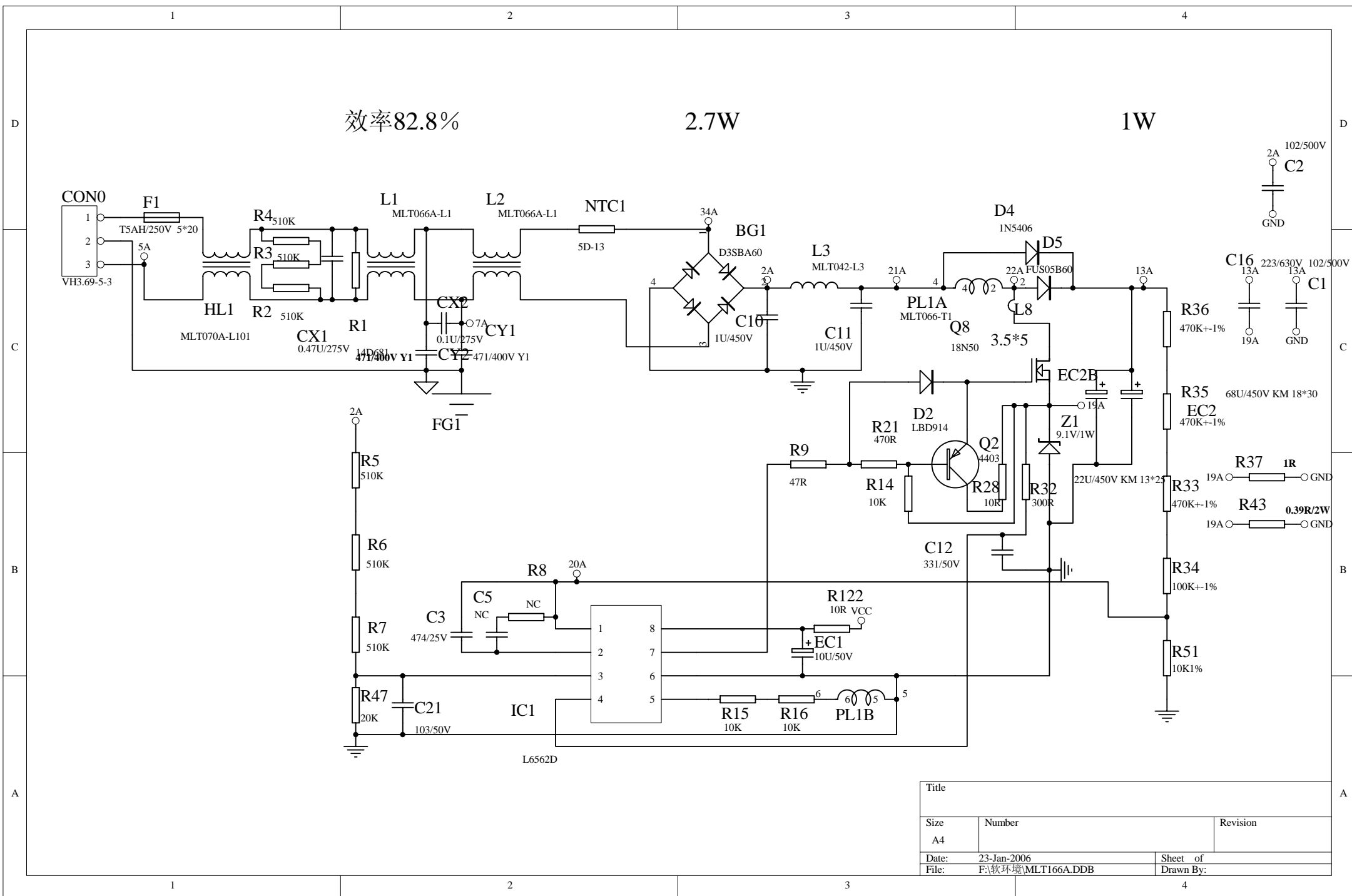






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Date:	2-Sep-2005	Sheet of
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Basic Operations & Circuit Description

Main Electric Components

(1). MODULE:

There are 1 pc. panel and 2 pcs. PCB including 1 pc. INVERTER board(L), 1 pc. T-CONTROL board,

(2).SIGNAL PROCESS

There are 5 pcs. PCBs including

- 1 pc. Audio&Tuner board,
- 1 pc. Main digital board,
- 1 pc. Keypad board,
- 1 pc. Remote Control Receiver board,
- 1 pc. DVD decoder board

(3).POWER

There are 1 pc. PCB for power.

PCB function

1. Power:

- (1). Input voltage: AC 100V~240V, 47Hz~63Hz.
Input range: AC 90V(Min)~264V(Max) auto regulation.
- (2). To provide power for PCBs.
 - a). +24V for Inverter.
 - b). +5Vsb for standby,
 - c). +5V for signal power,
 - d). +24V for Audio Amp power and converter to
 - e). +12V for Tuner power.

2. Main (Video InterFace) board:

- (1).Decoder the video signal (TV,CVBS,S-VIDEO) from analog to digital signal.
- (2).Converter the Video signals(TV,CVBS,S-VIDEO) and graphics signal (VGA,YPbPr) from interface to progressive,
- (3). Converter the Digital to fit the panel display mode and output the LVDS signal to Panel.

3. Tuner & Audio Board :

- (1) Convert TV RF signal to video and audio signal to Main board.
- (2). Decoder the TV SIF signal to audio signal,
- (3). Converter the audio to audio Amplifier and output to the speaker.

4. KEYBOARD

To get the main button control on LCD_TV as SOURCE,MENU, CHANEL +,CHANEL -, VOL +,VOL-, STANDBY functions.

5. Remote control board

Receive the remote signal and active for the control.

6. T-CONTROL board

Converter the LVDS signal to the digital signal for fitting the PANEL.

7. INVERTER board

Converter the low DC voltage +24V to high AC voltage to drive the backlight.

PCB failure analysis

1. CONTROL:

- a. Abnormal noise on screen.
- b. No picture.

2. MAIN (VIDEO):

- a. Lacking color, Bad color scale.
- b. No voice.
- c. No picture but with signals output, OSD and back light.
- d. Abnormal noise on screen.

3. POWER:

No picture, no power output.

Basic operation of LCD-TV

1. After turning on power switch, power board sends 5Vst-by Volt to Micro Processor IC waiting for ON signals from Key Switch or Remote Receiver.
2. When the ON signal from Key Switch or Remote Receiver is detected, Micro Processor will send ON Control signals to Power. Then Power sends (5Vsc, 12Vsc, 24V and RLY ON, Vs ON) to PCBs working. This time VIF will send signals to display back light, OSD on the panel and start to search available signal sources. If the audio signals input, they will be amplified by Audio AMP and transmitted to Speakers.
3. If some abnormal signals are detected (for example: over volts, over current, over temperature and under volts), the system will be shut down by Power off.

LCD basic display theory.

When an electrical field is applied to the LC planes, the LC molecules re-align themselves so that they are parallel to the electrical field. This electrical process is known as **twisted nematic field effect** or **TNFE**. In this alignment, polarized light is not twisted as it passes through the LC material (see Diagram 3A and 3B). If the front polarizer is oriented perpendicular to the rear polarizer, light will pass through the energized display but will be blocked by the rear polarizer. An LCD in this form is acting as a light shutter.

Displays with variable characters are created by selectively etching away the conductive surface that was originally deposited on the glass. Etched areas become the display's background; unetched areas become the display's characters.

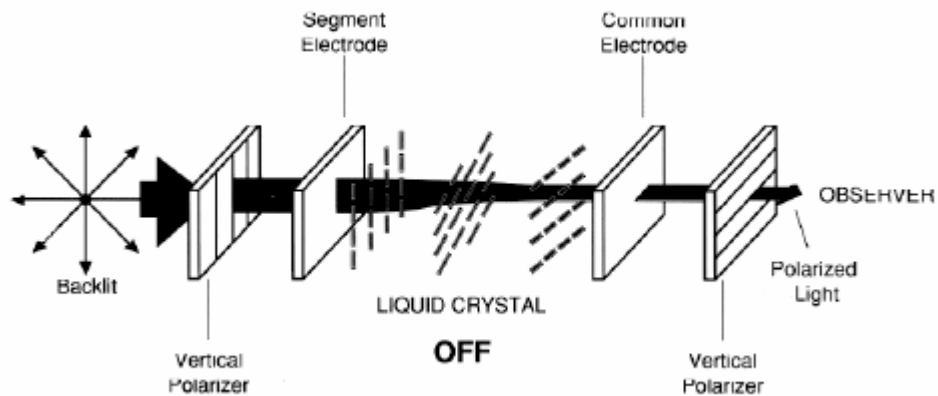


Diagram 3A. The "off" state of a TN LCD—the LC molecules form a twist and therefore cause polarized light to twist as it passes through.

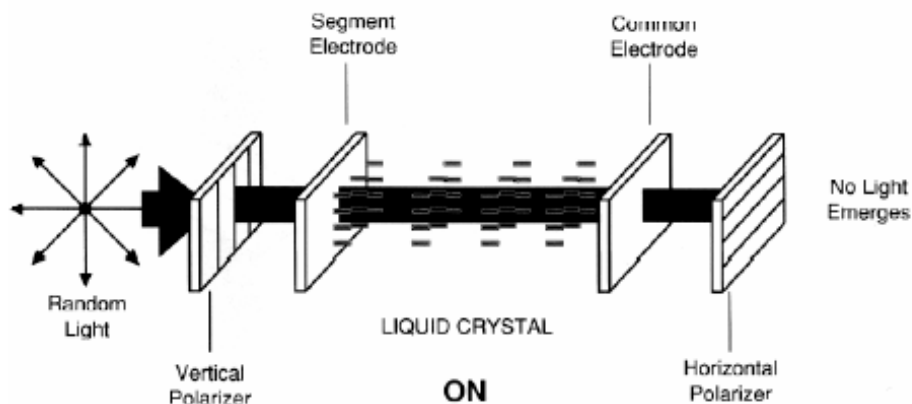
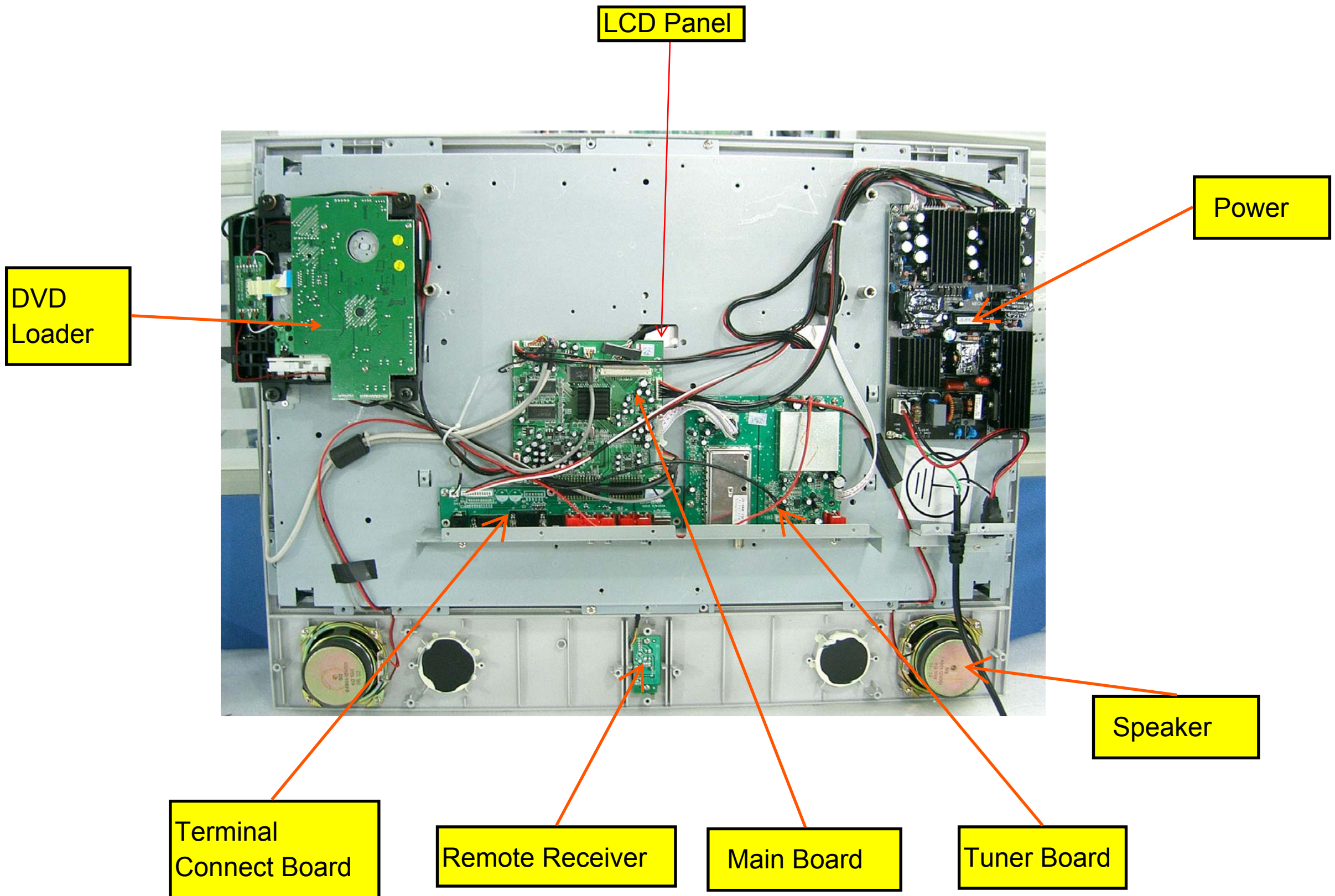


Diagram 3B. The "on" state—the electrical field re-aligns the LC molecules so they do not twist the polarized light.



IC DESCRIPTION

-MT8205G

-AT24C02

-MX29LV160BBTC

-LP2996

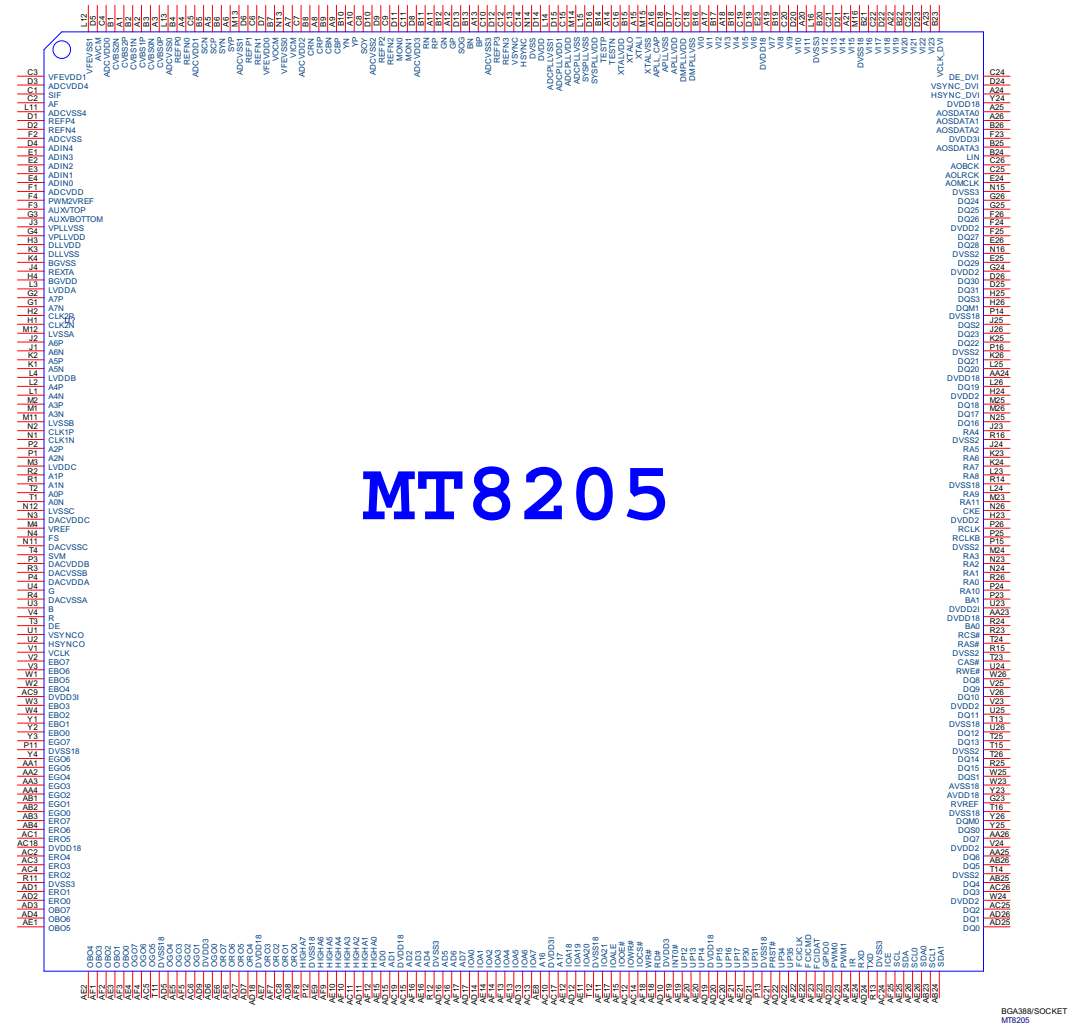
-AZ1117/H

-WM8776

-MX232A

-ISAV330

Pinout information



Pin Descriptions

2.3 Pin Descriptions

Table 2-1 provides detail video/audio port pin descriptions.

Table 2-1 video/audio port pin descriptions.

Pin	Symbol	Type	Description
E24	AOMCLK	O	Audio out master clock
C25	AOLRCK	O	Audio out left-right clock
C26	AOBCK	O	Audio out bit clock
A25	AOSDATA0	O	Audio out data line 0
A26	AOSDATA1	O	Audio out data line 1
B26	AOSDATA2	O	Audio out data line 2
B25	AOSDATA3	O	Audio out data line 3
B24	LIN	I	Audio line in
A3	CVBS0P	I	Composite Video input 0
A2	CVBS1P	I	Composite Video input 1
A1	CVBS2P	I	Composite Video input 2
C1	SIF	I	Tuner Sound SIF
C2	AF	I	Tuner Sound AF

Features

- Low Voltage and Standard Voltage Operation
 - 5.0 (V_{CC} = 4.5V to 5.5V)
 - 2.7 (V_{CC} = 2.7V to 5.5V)
 - 2.5 (V_{CC} = 2.5V to 5.5V)
 - 1.8 (V_{CC} = 1.8V to 5.5V)
- Internally Organized 128 x 8 (1K), 256 x 8 (2K), 512 x 8 (4K), 1024 x 8 (8K) or 2048 x 8 (16K)
- 2-Wire Serial Interface
- Bidirectional Data Transfer Protocol
- 100 kHz (1.8V, 2.5V, 2.7V) and 400 kHz (5V) Compatibility
- Write Protect Pin for Hardware Data Protection
- 8-Byte Page (1K, 2K), 16-Byte Page (4K, 8K, 16K) Write Modes
- Partial Page Writes Are Allowed
- Self-Timed Write Cycle (10 ms max)
- High Reliability
 - Endurance: 1 Million Cycles
 - Data Retention: 100 Years
- Automotive Grade and Extended Temperature Devices Available
- 8-Pin and 14-Pin JEDEC SOIC and 8-Pin PDIP Packages

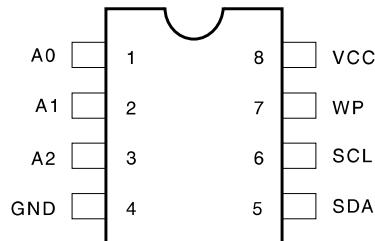
Description

The AT24C01A/02/04/08/16 provides 1024/2048/4096/8192/16384 bits of serial electrically erasable and programmable read only memory (EEPROM) organized as 128/256/512/1024/2048 words of 8 bits each. The device is optimized for use in many industrial and commercial applications where low power and low voltage operation are essential. The AT24C01A/02/04/08/16 is available in space saving 8-pin PDIP, 8-pin and 14-pin SOIC packages and is accessed via a 2-wire serial interface. In addition, the entire family is available in 5.0V (4.5V to 5.5V), 2.7V (2.7V to 5.5V), 2.5V (2.5V to 5.5V) and 1.8V (1.8V to 5.5V) versions.

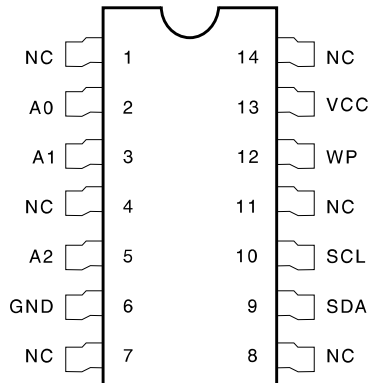
Pin Configurations

Pin Name	Function
A ₀ to A ₂	Address Inputs
SDA	Serial Data
SCL	Serial Clock Input
WP	Write Protect
NC	No Connect

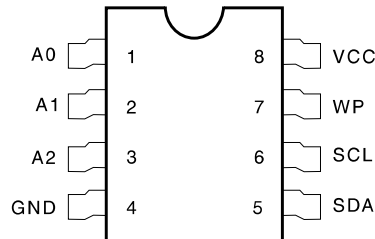
8-Pin PDIP



14-Pin SOIC



8-Pin SOIC



2-Wire Serial CMOS E²PROM

1K (128 x 8)

2K (256 x 8)

4K (512 x 8)

8K (1024 x 8)

16K (2048 x 8)

Absolute Maximum Ratings*

Operating Temperature.....-55°C to +125°C

Storage Temperature.....-65°C to +150°C

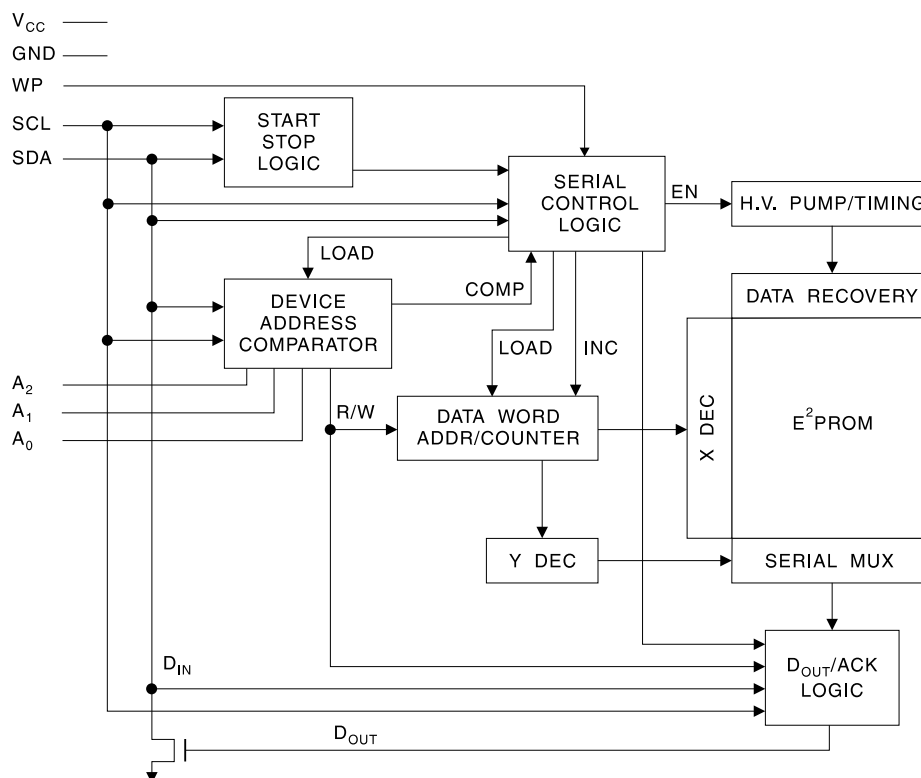
Voltage on Any Pin
with Respect to Ground-0.1V to +7.0V

Maximum Operating Voltage6.25V

DC Output Current.....5.0 mA

***NOTICE:** Stresses beyond those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

Block Diagram



Pin Description

SERIAL CLOCK (SCL): The SCL input is used to positive edge clock data into each E²PROM device and negative edge clock data out of each device.

SERIAL DATA (SDA): The SDA pin is bidirectional for serial data transfer. This pin is open-drain driven and may be wire-ORed with any number of other open-drain or open collector devices.

DEVICE/PAGE ADDRESSES (A2, A1, A0): The A2, A1 and A0 pins are device address inputs that are hard wired for the AT24C01A and the AT24C02. As many as eight 1K/2K devices may be addressed on a single bus system (device addressing is discussed in detail under the Device Addressing section).

The AT24C04 uses the A2 and A1 inputs for hard wire addressing and a total of four 4K devices may be addressed on a single bus system. The A0 pin is a no connect.

The AT24C08 only uses the A2 input for hardware addressing and a total of two 8K devices may be addressed on a single bus system. The A0 and A1 pins are no connects.

The AT24C16 does not use the device address pins which limits the number of devices on a single bus to one. The A0, A1 and A2 pins are no connects.

(continued)



MX29LV160BT/BB

16M-BIT [2Mx8/1Mx16] CMOS SINGLE VOLTAGE 3V ONLY FLASH MEMORY

FEATURES

- Extended single - supply voltage range 2.7V to 3.6V
- 2,097,152 x 8/1,048,576 x 16 switchable
- Single power supply operation
 - 3.0V only operation for read, erase and program operation
- **Fully compatible with MX29LV160A device**
- Fast access time: 70/90ns
- Low power consumption
 - 30mA maximum active current
 - 0.2uA typical standby current
- Command register architecture
 - Byte/word Programming (9us/11us typical)
 - Sector Erase (Sector structure 16K-Bytex1, 8K-Bytex2, 32K-Bytex1, and 64K-Byte x31)
- Auto Erase (chip & sector) and Auto Program
 - Automatically erase any combination of sectors with Erase Suspend capability.
 - Automatically program and verify data at specified address
- Erase Suspend/Erase Resume
 - Suspends sector erase operation to read data from, or program data to, any sector that is not being erased, then resumes the erase.
- Status Reply
 - Data polling & Toggle bit for detection of program and erase operation completion.
- Ready/Busy pin (RY/BY)
 - Provides a hardware method of detecting program or erase operation completion.
- Sector protection
 - Hardware method to disable any combination of sectors from program or erase operations
 - Temporary sector unprotect allows code changes in previously locked sectors.
- CFI (Common Flash Interface) compliant
 - Flash device parameters stored on the device and provide the host system to access
- 100,000 minimum erase/program cycles
- Latch-up protected to 100mA from -1V to VCC+1V
- Boot Sector Architecture
 - T = Top Boot Sector
 - B = Bottom Boot Sector
- Low VCC write inhibit is equal to or less than 1.4V
- Package type:
 - 44-pin SOP
 - 48-pin TSOP
 - 48-ball CSP
- Compatibility with JEDEC standard
 - Pinout and software compatible with single-power supply Flash
- 10 years data retention

GENERAL DESCRIPTION

The MX29LV160BT/BB is a 16-mega bit Flash memory organized as 2M bytes of 8 bits or 1M words of 16 bits. MXIC's Flash memories offer the most cost-effective and reliable read/write non-volatile random access memory. The MX29LV160BT/BB is packaged in 44-pin SOP, 48-pin TSOP and 48-ball CSP. It is designed to be reprogrammed and erased in system or in standard EPROM programmers.

The standard MX29LV160BT/BB offers access time as fast as 70ns, allowing operation of high-speed microprocessors without wait states. To eliminate bus contention, the MX29LV160BT/BB has separate chip enable (\overline{CE}) and output enable (\overline{OE}) controls.

MXIC's Flash memories augment EPROM functionality with in-circuit electrical erasure and programming. The MX29LV160BT/BB uses a command register to manage this functionality. The command register allows for

100% TTL level control inputs and fixed power supply levels during erase and programming, while maintaining maximum EPROM compatibility.

MXIC Flash technology reliably stores memory contents even after 100,000 erase and program cycles. The MXIC cell is designed to optimize the erase and programming mechanisms. In addition, the combination of advanced tunnel oxide processing and low internal electric fields for erase and program operations produces reliable cycling. The MX29LV160BT/BB uses a 2.7V~3.6V VCC supply to perform the High Reliability Erase and auto Program/Erase algorithms.

The highest degree of latch-up protection is achieved with MXIC's proprietary non-epi process. Latch-up protection is proved for stresses up to 100 milliamps on address and data pin from -1V to VCC + 1V.

LP2996

DDR Termination Regulator

General Description

The LP2996 linear regulator is designed to meet the JEDEC SSTL-2 specifications for termination of DDR-SDRAM. The device contains a high-speed operational amplifier to provide excellent response to load transients. The output stage prevents shoot through while delivering 1.5A continuous current and transient peaks up to 3A in the application as required for DDR-SDRAM termination. The LP2996 also incorporates a V_{SENSE} pin to provide superior load regulation and a V_{REF} output as a reference for the chipset and DIMMs.

An additional feature found on the LP2996 is an active low shutdown (\overline{SD}) pin that provides Suspend To RAM (STR) functionality. When \overline{SD} is pulled low the V_{TT} output will tri-state providing a high impedance output, but, V_{REF} will remain active. A power savings advantage can be obtained in this mode through lower quiescent current.

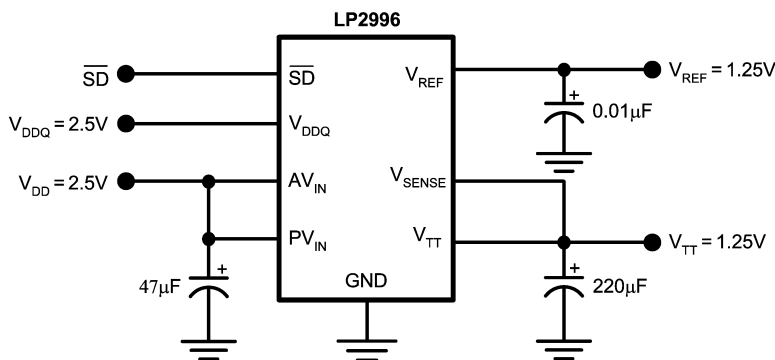
Features

- Source and sink current
- Low output voltage offset
- No external resistors required
- Linear topology
- Suspend to Ram (STR) functionality
- Low external component count
- Thermal Shutdown
- Available in SO-8, PSOP-8 or LLP-16 packages

Applications

- DDR-I and DDR-II Termination Voltage
- SSTL-2 and SSTL-3 Termination
- HSTL Termination

Typical Application Circuit



20057518

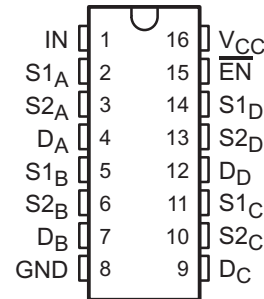
TS5V330

QUAD SPDT WIDE-BANDWIDTH VIDEO SWITCH WITH LOW ON-STATE RESISTANCE

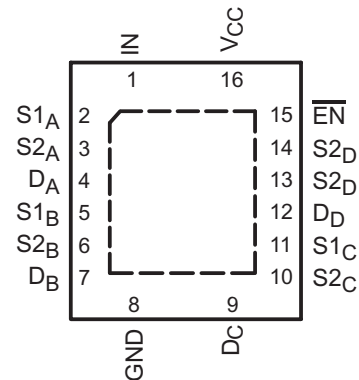
SCDS164A – MAY 2004 – REVISED MAY 2004

- Low Differential Gain and Phase ($D_G = 0.64\%$, $D_P = 0.1$ Degrees Typ)
- Wide Bandwidth (BW = 300 MHz Min)
- Low Crosstalk ($X_{TALK} = -63$ dB Typ)
- Low Power Consumption ($I_{CC} = 3 \mu A$ Max)
- Bidirectional Data Flow, With Near-Zero Propagation Delay
- Low ON-State Resistance ($r_{on} = 3 \Omega$ Typ)
- V_{CC} Operating Range From 4.5 V to 5.5 V
- I_{off} Supports Partial-Power-Down Mode Operation
- Data and Control Inputs Provide Undershoot Clamp Diode
- Control Inputs Can Be Driven by TTL or 5-V/3.3-V CMOS Outputs
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Performance Tested Per JESD 22
 - 2000-V Human-Body Model (A114-B, Class II)
 - 1000-V Charged-Device Model (C101)
- Suitable for Both RGB and Composite-Video Switching

D, DBQ, OR PW PACKAGE
(TOP VIEW)



RGY PACKAGE
(TOP VIEW)



description/ordering information

The TI TS5V330 video switch is a 4-bit 1-of-2 multiplexer/demultiplexer with a single switch-enable (\overline{EN}) input. When \overline{EN} is low, the switch is enabled and the D port is connected to the S port. When \overline{EN} is high, the switch is disabled and the high-impedance state exists between the D and S ports. The select (IN) input controls the data path of the multiplexer/demultiplexer.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	QFN – RGY	Tape and reel	TS5V330RGYR	TE330
		Tube	TS5V330D	TS5V330
	SOIC – D	Tape and reel	TS5V330DR	
		Tape and reel	TS5V330DBQR	TE330
	SSOP (QSOP) – DBQ	Tube	TS5V330PW	TE330
		Tape and reel	TS5V330PWR	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.



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24-bit, 192kHz Stereo CODEC with 5 Channel I/P Multiplexer

DESCRIPTION

The WM8776 is a high performance, stereo audio CODEC with five channel input selector. The WM8776 is ideal for surround sound processing applications for home hi-fi, DVD-RW and other audio visual equipment.

A stereo 24-bit multi-bit sigma delta ADC is used with a five stereo channel input mixer. Each ADC channel has programmable gain control with automatic level control. Digital audio output word lengths from 16-32 bits and sampling rates from 32kHz to 96kHz are supported.

A stereo 24-bit multi-bit sigma delta DAC is used with digital audio input word lengths from 16-32 bits and sampling rates from 32kHz to 192kHz. The DAC has an input mixer allowing an external analogue signal to be mixed with the DAC signal. There are also Headphone and line outputs, with volume controls for the headphones.

The WM8776 supports fully independent sample rates for the ADC and DAC. The audio data interface supports I²S, left justified, right justified and DSP formats.

The device is controlled in software via a 2 or 3 wire serial interface, selected by the MODE pin, which provides access to all features including channel selection, volume controls, mutes, and de-emphasis facilities.

The device is available in a 48-pin TQFP package.

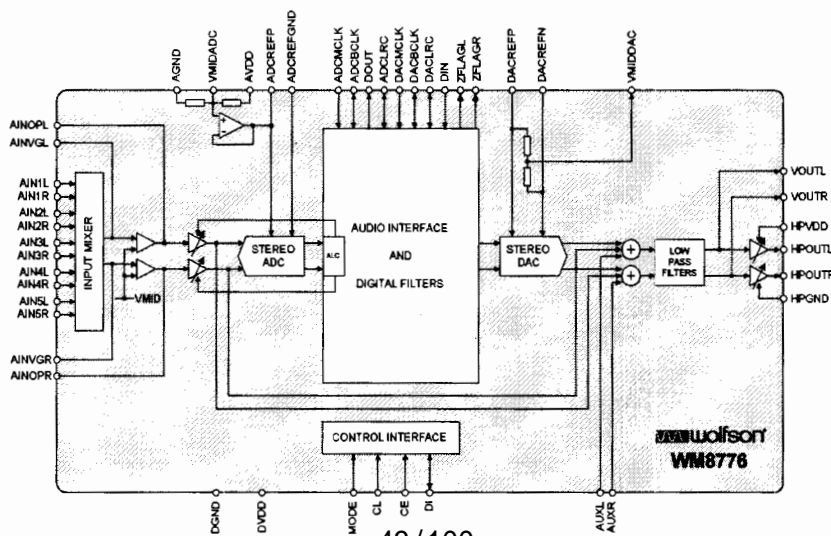
FEATURES

- Audio Performance
 - 108dB SNR ('A' weighted @ 48kHz) DAC
 - 102dB SNR ('A' weighted @ 48kHz) ADC
- DAC Sampling Frequency: 32kHz – 192kHz
- ADC Sampling Frequency: 32kHz – 96kHz
- Five stereo ADC inputs with analogue gain adjust from +24dB to –21dB in 0.5dB steps
- Programmable Limiter or Automatic Level Control (ALC)
- Stereo DAC with independent analogue and digital volume controls
- Stereo Headphone and Line Output
- 3-Wire SPI Compatible or 2-Wire Software Serial Control Interface
- Master or Slave Clocking Mode
- Programmable Audio Data Interface Modes
 - I²S, Left, Right Justified or DSP
 - 16/20/24/32 bit Word Lengths
- Analogue Bypass Path Feature
- Selectable AUX input to the volume controls
- 2.7V to 5.5V Analogue, 2.7V to 3.6V Digital supply Operation

APPLICATIONS

- Surround Sound AV Processors and Hi-Fi systems
- DVD-RW

BLOCK DIAGRAM





±15kV ESD-Protected, +5V RS-232 Transceivers

General Description

The MAX202E-MAX213E, MAX232E/MAX241E line drivers/receivers are designed for RS-232 and V.28 communications in harsh environments. Each transmitter output and receiver input is protected against ±15kV electrostatic discharge (ESD) shocks, without latchup. The various combinations of features are outlined in the *Selection Guide*. The drivers and receivers for all ten devices meet all EIA/TIA-232E and CCITT V.28 specifications at data rates up to 120kbps, when loaded in accordance with the EIA/TIA-232E specification.

The MAX211E/MAX213E/MAX241E are available in 28-pin SO packages, as well as a 28-pin SSOP that uses 60% less board space. The MAX202E/MAX232E come in 16-pin narrow SO, wide SO, and DIP packages. The MAX203E comes in a 20-pin DIP/SO package, and needs no external charge-pump capacitors. The MAX205E comes in a 24-pin wide DIP package, and also eliminates external charge-pump capacitors. The MAX206E/MAX207E/MAX208E come in 24-pin SO, SSOP, and narrow DIP packages. The MAX232E/MAX241E operate with four 1μF capacitors, while the MAX202E/MAX206E/MAX207E/MAX208E/MAX211E/MAX213E operate with four 0.1μF capacitors, further reducing cost and board space.

Applications

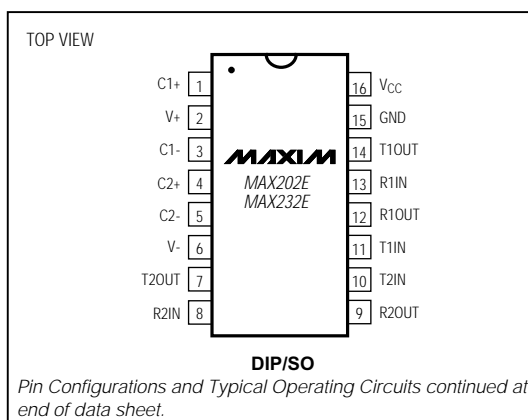
Notebook, Subnotebook, and Palmtop Computers
Battery-Powered Equipment
Hand-Held Equipment

Ordering Information appears at end of data sheet.

Features

- ♦ **ESD Protection for RS-232 I/O Pins:**
 - ±15kV—Human Body Model
 - ±8kV—IEC1000-4-2, Contact Discharge
 - ±15kV—IEC1000-4-2, Air-Gap Discharge
- ♦ **Latchup Free (unlike bipolar equivalents)**
- ♦ **Guaranteed 120kbps Data Rate—LapLink™ Compatible**
- ♦ **Guaranteed 3V/μs Min Slew Rate**
- ♦ **Operate from a Single +5V Power Supply**

Pin Configurations



Selection Guide

PART	No. of RS-232 DRIVERS	No. of RS-232 RECEIVERS	RECEIVERS ACTIVE IN SHUTDOWN	No. of EXTERNAL CAPACITORS	LOW-POWER SHUTDOWN	TTL THREE-STATE
MAX202E	2	2	0	4 (0.1μF)	No	No
MAX203E	2	2	0	None	No	No
MAX205E	5	5	0	None	Yes	Yes
MAX206E	4	3	0	4 (0.1μF)	Yes	Yes
MAX207E	5	3	0	4 (0.1μF)	No	No
MAX208E	4	4	0	4 (0.1μF)	No	No
MAX211E	4	5	0	4 (0.1μF)	Yes	Yes
MAX213E	4	5	2	4 (0.1μF)	Yes	Yes
MAX232E	2	2	0	4 (1μF)	No	No
MAX241E	4	5	0	4 (1μF)	Yes	Yes

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Maxim Integrated Products 1

For free samples & the latest literature: <http://www.maxim-ic.com>, or phone 1-800-998-8800

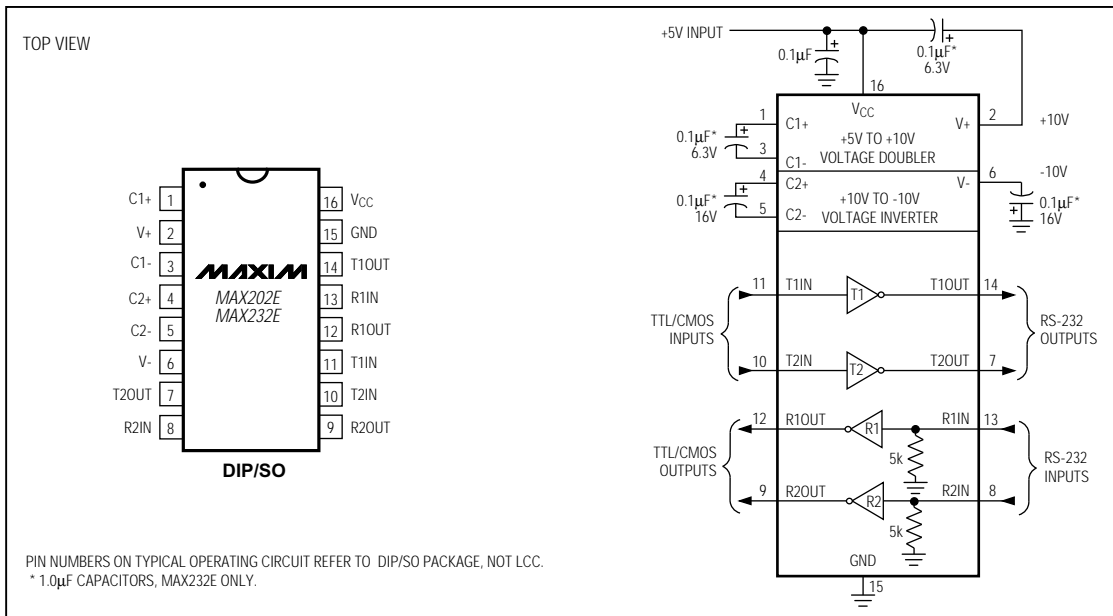
MAX202E-MAX213E, MAX232E/MAX241E

±15kV ESD-Protected, +5V RS-232 Transceivers

Table 3. DB9 Cable Connections
Commonly Used for EIA/TIAE-232E and V.24 Asynchronous Interfaces

PIN	CONNECTION	
1	Received Line Signal Detector (sometimes called Carrier Detect, DCD)	Handshake from DCE
2	Receive Data (RD)	Data from DCE
3	Transmit Data (TD)	Data from DTE
4	Data Terminal Ready	Handshake from DTE
5	Signal Ground	Reference point for signals
6	Data Set Ready (DSR)	Handshake from DCE
7	Request to Send (RTS)	Handshake from DTE
8	Clear to Send (CTS)	Handshake from DCE
9	Ring Indicator	Handshake from DCE

Pin Configurations and Typical Operating Circuits (continued)



MAXIM

SPECIFICATION FOR APPROVAL

Part No. MLT166A

Description: LCD Power Supply Specification

Revision: 1.0

Customer. _____

Customer Approval No. : _____

Please return to us one original of “SPECIFICATION FOR APPROVAL” with your approved signatures.

APPROVED SIGNATURES

APPROVED BY: _____ DATE: _____

CHOP & SIGNATURES: _____

SHENZHEN MEGMEET ELECTRICAL TECHNOLOGY CO.,LTD

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Document No. :
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REV:
1.0

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[illegible]

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Section

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 - 1.1 Input Electrical Characteristics Overview
 - 1.2 Output Electrical Characteristics Overview
 - 1.2.1 Output Voltage ,Current & Regulation.
 - 1.2.2 DC Output Ripple & Noise.
 - 1.2.3 Output Transient Response.
 - 1.2.4 DC Output Hold-Up Time.
 - 1.2.4 DC Output Overshoot At Turn On & Turn Off.
 - 1.2.6 DC output voltage rise time
 - 1.3 Remote On/Off Control:
 - 1.4 Protection:
 - 1.4.1 DC output Over Voltage Protection.
 - 1.4.2 DC Output Over current Protection.
 - 1.4.3 DC Output Short Circuit Protection.
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 - 5.3 Altitude
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 - 5.6 Impact
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8. Pin Connection

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1. Power Supply Overview

1.1 Table 1 Input Electrical Characteristics Overview

Input voltage range	90Vac to 264Vac
Normal voltage range	100Vac to 240Vac
Frequency range	50Hz/60Hz \pm 5%
Max input ac current	2.6Amax at full load condition
Inrush current (cold start)	40A _{typ} peak, 120Vac; 60A _{typ} peak, 220Vac
Efficiency(full load)	80%min at 90Vac; 82%min at 220Vac
Harmonic current	Meet GB17625.1-1998/IEC61000-3-2 class D
Leakage Current	Less Than 0.75mA, 230Vac input
Standby Power Loss	\leq 1W, 240Vac input
Input Fuse	T5AH/250Vac

1.2 Output Electrical Characteristics Overview

1.2.1 Table 2 Output Voltage ,Current & Regulation.

Output Voltage	Regulation	Min. current	Rated current	Peak current
+A24V	\pm 10%	0.2A	1A	2A*
+24V	\pm 5%	0.2A	4A	5A*
+12V	\pm 10%	0.2A	2A	3A*
+5.0V	\pm 5%	0.1A	3A	4A*
5. Vsb	\pm 5%	0.01A	0.5A	1A*

Note:* pulse width within 100ms

1.2.2 Table 3 DC Output Ripple & Noise.

Output Voltage	Ripple & Noise (Max.)
+A24V	200mVp-p@25°C 350mVp-p@-10°C
+24V	150mVp-p@25°C ; 250mVp-p@-10°C
+12V	100mVp-p@25°C ; 150mVp-p@-10°C
+5.0V	50mVp-p@25°C ; 100mVp-p@-10°C
5Vsb	50mVp-p@25°C ; 100mVp-p@-10°C

Note: 1) Measurements shall be made with an oscilloscope with 20MHz bandwidth.

2) Outputs shall be bypassed at the connector with a 0.1uF ceramic capacitor and a 10uF electrolytic capacitor to simulate system loading.

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1.2.3 Output Transient Response.

Table 4. Test condition.

Voltage Tolerance Limit	Slew Rate	Load Change
24V、5.0V、5Vsb \pm 5%, A24V、12V \pm 10%	0.2A/uS	Min. to 50% load and 50% to Max load
all outputs \pm 10%	0.2A/uS	Min. load to Max load

Note: Transient response measurements shall be made with a load changing repetition rate of 50Hz to 10kHz.

1.2.4 Table 5 DC Output Hold-Up Time.

Output Voltage	120Vac input	220Vac input
+A24V、+24V	≥ 10 mS	≥ 10 mS
+12V	≥ 10 mS	≥ 10 mS
+5.0V、5Vsb	≥ 10 mS	≥ 10 mS

Note: All of dc output at full load.

1.2.5 Table 6 DC Output Overshoot At Turn On & Turn Off.

Output Channel	Output (V)	Over shoot voltage (V)	
		Turn on	Turn off
+24V	+24V	5%	5%
+A24V	+A24V	10%	10%
+12V	+12V	10%	10%
+5.0V	+5.0V	5%	5%
5Vsb	5Vsb	10%	10%

Note: All of dc output current from Min. to Max.

1.2.6 Table 7 DC output voltage rise time

Output Voltage	120Vac input & Full Load	220Vac input & Full Load
+24V	≤ 30 mS	≤ 30 mS
+A24V	≤ 30 mS	≤ 30 mS
+12V	≤ 20 mS	≤ 20 mS
+5.0V	≤ 20 mS	≤ 20 mS
5Vsb	≤ 20 mS	≤ 20 mS

Note: The output voltages shall rise from 10% to 90% of their output voltage. 50

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1.3 Remote On/Off Control:

The power supply DC outputs (without +5.0Vsb) shall be enable with an active-high TTL($\geq 2.5V/2.0mA$)-compatible signal(Ps-on). The +5.0Vsb is on whenever the AC power is present.

- * When Ps-on is pulled to TTL high, the DC outputs are to be enabled.
- * When Ps-on is pulled to TTL low or open circuit, the DC outputs are to be disabled.

Table 8.

Ps-on Signal	Comments	Outputs
Ps-on- high	$\geq 2.5V \& 2.0mA$ (source)	Enable
Ps-on- low	$\leq 1.0V$	X
Ps-on-open	--	X

1.4 Protection:

1.4.1 Table 9 DC output Over Voltage Protection.

Output Voltage	Max. Over Voltage	Comments
+24V	30V	Hiccup
+5.0 V	7.5Vtyp	Hiccup

Note: The power supply shall be test at max AC voltage (270Vac) and min load or no load.

1.4.2 Table 10 DC Output Over current Protection.)

Output Voltage	Over Current	Comments
+24V	$\geq 5A_{typ}$	Hiccup
+A24V	$\geq 2A_{typ}$	Hiccup
+12V	$\geq 3A_{typ}$	Hiccup
+5.0V	$\geq 4A$	Hiccup
5Vsb	$\geq 1A$	Hiccup

1.4.3 Table 11 DC Output Short Circuit Protection.)

Output Voltage	Comments
+24V/+A24V	Hiccup
+12V	Hiccup

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+5.0V	Hiccup
5VSB	Hiccup

Note:

1.4.4 Reset After Shutdown.

Recycle the ps-on signal, the power supply will restart after the fault removed.

2. Isolation

2.1 Table 12)

Input To Output	DC500V 15M Ω min (at room temperature)
Input To FG	DC500V 15M Ω min (at room temperature)
Output To FG	Non Isolated

Note:

2.2 Table 13)

Input To Output	3000Vac 50Hz 1minute \leq 10mA
Input To FG	1500Vac 50Hz 1minute \leq 10mA
Output To FG	Non Isolated

Note: Open FG and Output return..

3. Safety

The power supply shall compliance with the following Criterion:

- 1) UL60950
- 2) EN60950
- 3) GB4943-1995/GB8898-2001

4. EMC

4.1 EMI

The power supply shall compliance with the following Criterion:

1) Conduction Emission :

- *EN55013, CLASS B
- *GB13837-2003, CLASS B
- *CISPR13:2001

2) Radiated Emission :

- *EN55013, CLASS B
- *GB13837-2003, CLASS B
- *CISPR13:2001

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The power board should be assembled in customer product to test for passing the regulations.

4.2 EMS

The power supply shall compliance with the following Criterion:

- 1) ESD
*GB17626. 2-1998/IEC61000-4-2 Lever 3
- 2) EFT
*GB17626. 4-1998/IEC61000-4-4 Lever 3
- 3) SURGE
*GB17626. 5-1998/IEC61000-4-5 Lever 3
- 4) DIP
*GB17626. 11-1998/IEC61000-4-11 Class B/C

5. Environmental Requirement

5.1 Temperature

- * Operating: -10℃ to +50℃.
- * Store: -20℃ to +80℃.

5.2 Humidity

- * Operating: From 10%to90% relative humidity (non-condensing).
- * Store: From 5 to 95% relative humidity (non-condensing).

5.3 Altitude

- * Operating: to10,000 ft.
- * Store: to 20,000ft.

5.4 Cooling Method

- * Ventilation cooling .

5.5 Vibration

- * 10-55Hz, 19.6m/s² (2G), 3minutes period, 20minutes each along X, Y and Z axis.

5.6 Impact

- * 49m/s² (5G),11ms, once each X, Y and Z axis.

6. Dimension

- * 200mm X 130mm X 26mm (L *W * H).

7. Weight

- * 550g

8. Pin Connection

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Table 15 CON1**VENTER:**

NO.	Pin Connection	Function
1. 2. 3	+12V	+12VDC OUTPUT
4. 5. 6	GND	RETURN
7. 8. 9. 10. 11	+5. 0V	+5. 0VDC OUTPUT

Note: CON1 -- JST VA CONNEETION, TYPE : pitch:2.0mm

Table 16 CON2**VENTER:**

NO.	Pin Connection	Function
1	STB (PS-ON)	SMPS ON CONTROL (on-high)
2. 3	GND	+5. 0Vsb RETURN
4. 5	+5. 0Vsb	+5. 0Vsb OUTPUT

Note: CON2 -- JST VA CONNEETION, TYPE : pitch:2.0mm

Table 17 CON3**VENTER:**

NO.	Pin Connection	Function
5. 6. 7. 8	+24VDC	+24DC OUTPUT
1. 2. 3. 4	GND	+24VDC RETURN

Note: CON3 -- JST VA CONNEETION, TYPE : pitch:2.50mm

Table 17 CON4**VENTER:**

NO.	Pin Connection	Function
3. 4	+A24VDC	+A24DC OUTPUT
1. 2	GND	+A24VDC RETURN

Note: CNO4 -- JST VA CONNEETION, TYPE : pitch:2.0mm

Table 18 CON0**VENTER:**

NO.	Pin Connection	Function
1	AC-N	AC INPUT NATURE
2	NC	NC
3	AC-L	AC INPUT LINE

Note: CN3 -- JST VA CONNEETION, TYPE : pitch:3.96mm

Fig.8.1 Pin Connection (Top View)**MEGMEET ELECTRICAL TECHNOLOGY CO., LTD.**

DESCRIPTION:

SPECIFICATION

THESE SPECIFICATION ARE THE PROPERTY OF MEGMEET ELECTRICAL TECHNOLOGY CO., LTD AND SHALL NOT BE REPRODUCED OR USED AS THE BASIS FOR THE MANUFACTURE OR SELL OF APPARATUSES OR DEVICES WITHOUT PERMISSION.

Model No. :

MLT166A

Document No. :

MLT166A-1.0

REV:

1.0

DATE

11-15-2005

PREPARED

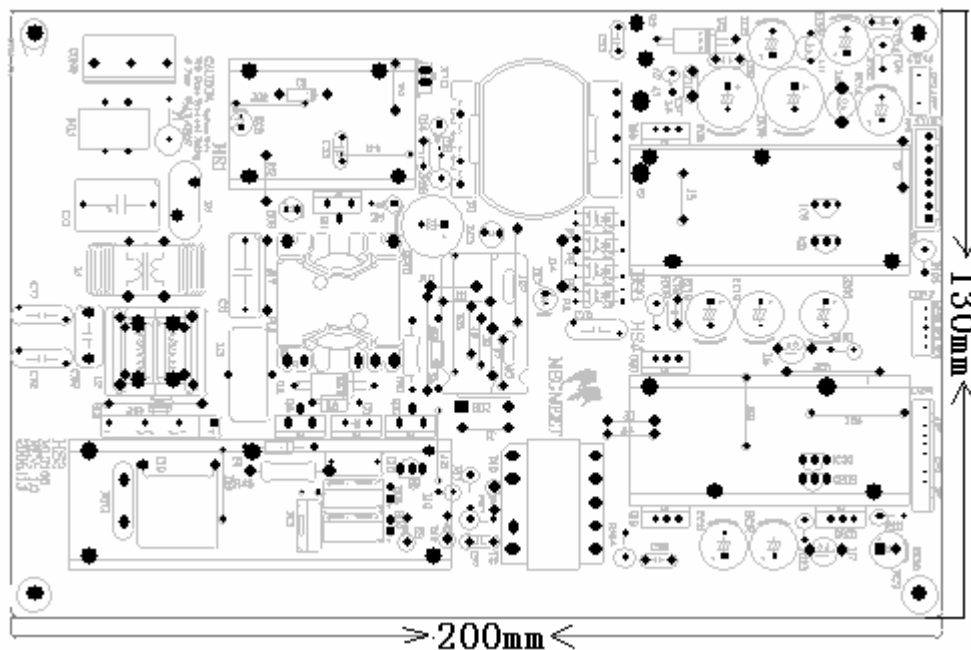
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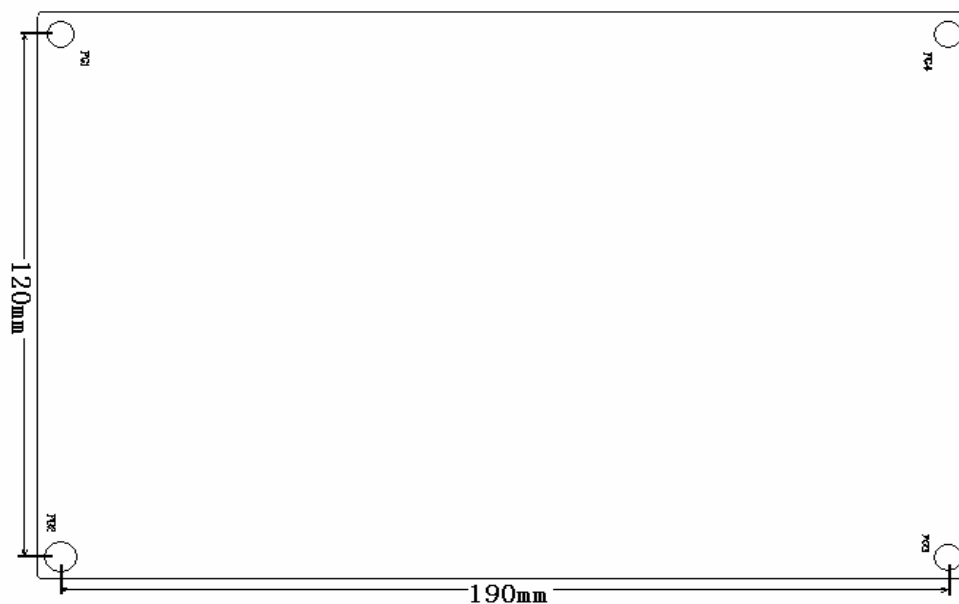
GUI

APPROVED

TONY TANG



9. Power Supply Mounting



MEGMEET ELECTRICAL TECHNOLOGY CO., LTD.

DESCRIPTION:
SPECIFICATION

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Model No. :
MLT166A

Document No. :
MLT166A-1.0

REV:
1.0

DATE	PREPARED	CHECKED	APPROVED
11-15-2005	RHJ	GUI	TONY TANG

SPECIFICATION

CUSTOMER: _____

DESCRIPTION: Slot-in DVD LOADER

MODEL: DL-06 series(DL-06**)

ISSUE DATE: 2005.11.02

CUSTOMER APPROVED	

Approved	Checked by Sales Dept.	Checked by Technical Dept.	Prepared

FORYOU 惠州市华阳多媒体电子有限公司
HUIZHOU FORYOU MULTIMEDIA ELECTRONICS CO., LTD.

-
1. Scope
 - 1.1 This specification applies to Slot-in DVD mechanism for DVD player (thereafter called DVD mechanism). Foryou model : DL-06**.
 - 1.2 Any query over the specification shall be expressed by R&D dept. of Foryou Multimedia Electronics Co.,Ltd.
 - 1.3 For improving performance purpose, this specification is subject to change according to pre-agreement established between us.
 - 1.4 Hardware and software or manufacturing process may subject to change for improvements within the rang of the specifications.
 2. Dimension of shell and installation
 - 2.1 See attachment for details of dimension of shell and installation.
 3. General specification
 - 3.1 Mechanism
 - 3.1.1 Disc loading: Motorized loading.
 - 3.1.2 Disc ejecting: Motorized ejection.
 - 3.1.3 Play: Loading → auto play
 - 3.1.4 Skew adjusting: adjust two points on the base of spindle motor.
 - 3.1.5 Pick-up feed mode: gear and rack drive.
 - 3.1.6 Range of pick-up movement: 22.5mm ~ 59mm, from the center of spindle motor.

3.1.7 Anti vibration: two steps of dampers to reduce the vibration.

3.2 Power supply

DC12 $\pm 1V$ (600 mA) & DC5 $\pm 0.2V$ (660 mA) .

3.3 Pick-up

3.3.1 PVR-520T、PVR-502W (MITSUMI), HOP-1200S (W) (HITACHI)、
OPU-3153 (SANKYO)、SF-HD62 (SANYO)、SF-HD65 (SANYO)

PVR-520T、PVR-502W (MITSUMI)、HOP-1200S (W) (HITACHI)、
OPU-3153 (SANKYO)、SF-HD62 (SANYO)、SF-HD65 (SANYO) two laser diode and
single object lens pickup.

3.4 Motor

3.4.1 Spindle motor: DC brush motor: CCM03-030R1-26O (Moretech).

3.4.2 Sled motor: WRF-300CA-09600.

3.4.3 Loading motor: WFF-050SB-10200.

3.5 Detect switch

3.5.1 Pick-up inner position detecting SW: (WI-A278)、(DS3-A-0001)

3.5.2 Disc chucking detecting SW: ESE22 (Type B) \times 1pcs

3.5.3 Disc detecting SW: ESE22 (Type B) \times 2pcs (Panasonic).

3.6 Weight: approximate 476 g.

4. General performance

4.1 Disc specification

Diameter of disc: $\Phi 120 \pm 0.3$, $\Phi 80 \pm 0.3$

Thickness of Disc: 1.2(+0.3,-0.1)

Type of disc:

DVD Video;
CD-DA;
Video CD;
CD-R, CD-RW;

- 4.2 Prevention from the 2nd disc insertion: the second disc can't be loaded when there is a disc in mechanism.

- 4.3 Noise Spec. ≤ 65 dB (A)

Noise level tests shall be carried out in an anechoic room with background noise 20 dB (A) or less. Noise shall be measured at a position 10cm from the front of the mechanical section.

5. Conditions of operation and storage

- 5.1 Operation temperature range: 0°C ~ +45°C.

- 5.2 Range of storage: -20°C ~ +60°C

- 5.3 Operation moisture range: 10% ~ 80% RH.

- 5.4 Storage moisture range: 0% ~ 90% RH.

- 5.5 Atmospheric pressure: 860mBar ~ 1060 mBar.

6. Condition of performance evaluation

- 6.1 Installation: see attachment. Tightened on work table; Installation angle:
forth and back: $\pm 10^\circ$, left and right: $\pm 10^\circ$.

- 6.2 Environment of evaluation
Temperature $25 \pm 2^\circ\text{C}$
Humidity $60 \pm 5\%$ (RH)

If there is no problem about the environment of evaluation, may according to the condition as below:

Temperature: +15°C ~ +30°C

Humidity: 45% ~ 75%RH

Noise: in an anechoic room with background noise 20dB (A) or less.

6.3 Test circuit and equipment

6.3.1 Refer FORYOU's standard circuit and equivalent.

7. Reliability test

7.1 Environment test

Item	Specification
7.1.1 Test of high temperature storage	After 24hours kept at +60°C, and then 16 hours at room temperature, the mechanism shall be able to load/eject and playback within this process.(Test disc:TCD-792 and TDV-520A)
7.1.2 Test of low temperature storage	After 24hours kept at -20°C, and then 16 hours at room temperature, the mechanism shall be able to load/eject and playback within this process.(Test disc:TCD-792 and TDV-520A)
7.1.3 Test of high temperature and high moisture storage	After 48hours kept at +40°C, 90%RH, and then 16 hours at room temperature, the mechanism shall be able to load/eject and playback within this process.(Test disc:TCD-792 and TDV-520A)

7.1.4 High and low temperature cycling test	Applied -20℃(1H)←→60℃(1H)(temperature slope 80℃/H), 5cycles,then place at normal temperature for 16 hours, the mechanism shall be able to load/eject and playback within this process.(Test disc:TCD-792 and TDV-520A)
7.1.5 Test of high temperature operation	DVD mechanism shall be kept in 45℃ for 4 hours, and then operate, the mechanism shall be able to load/eject and playback within this process.(Test disc:TCD-792 and TDV-520A)
7.1.6 Test of low temperature operation	DVD mechanism shall be kept in 0℃ for 4 hours, and then operate, the mechanism shall be able to load/eject and playback within this process.(Test disc:TCD-792 and TDV-520A)

7.2 Life test

Item	Specification
7.2.1 Continue playback ability	When a mechanism is executed for continuous playing at room temperature for 1,000H, the mechanism shall be able to playback standard disc TDV-520A and TCD-792.
7.2.2 Feed motion	After conduct 200,000 times of pick-up feeding motion at room temperature, mechanism shall be able to playback standard disc TDV-520A and TCD-792. (One cycle: inner →outer→ inner).
7.2.3 Loading and ejection	At normal room temperature, after 10,000 times of disc loading and ejection circulation, mechanism shall be able to playback standard disc TDV-520A and TCD-792. (One cycle :Disc in →playback → disc out)

7.3 Drop and impact test:

Item	Specification
------	---------------

7.3.1 Shock test	(1 time ,6ms), 70G crash impact on each of 6 sides of mechanism. Mechanism shall be able to playback standard disc TDV-520A and TCD-792.
7.3.2 Drop test	<p>After one time of drop test with surface, edge and corner (packing with 10sets per carton), the mechanism shall be able to playback standard disc TDV-520A and TCD-792.</p> <p>Drop with surface: drop height 600mm, Drop sequence: bottom, front, left, back, right. Each surface drop one time.</p> <p>Drop with corner: drop height 450mm, Drop one of corners of carton bottom one time.</p> <p>Drop with edge: drop height 450mm, Each edge of drop corner (three edges) drop one time.</p>

7.4 Durability test of vibration

Item	Specification
7.4.1 Durability test of vibration	Acceleration 2.5G, Frequency 10~50Hz, sweep time 5minutes, test time is 20minutes with each of 3 directions. After that test, mechanism shall be able to playback standard disc TDV-520A and TCD-792.

7.5 The test environment is the same as item 6.2 except for special note.

8. Ref appearance drawing

9. Caution:

9.1 It is not allowed to disassembly and re-tune the mechanism without special training because the mechanism is assembled and tuned using special method.

9.2 Storage: avoid storing the mechanism in high temperature, heavy wet and dusty place.

9.3 Handling: avoid extra force to the mechanism when handling.

- 9.4 Static-proof action should be taken when touch the mechanism since LD and OEIC can be easily damaged by static.
- 9.5 Hand touch pickup is forbidden.
- 9.6 Must avoid laser beam shooting at eyes directly since the laser beam can hurt eyes.
- 10. Attachment
- 10.1 《Model Description in detail》
- 10.2 《Appearance drawing of DL-06》
- 10.3 《Mechanism schematic diagram of DL-06, set in PCB of customer》
- 10.4 《customer Servo PCB of DL-06》
- 10.5 《Package specification of DL-06》
- 10.6 《Guide of Mechanism installation and cantions on assembly》
- 10.7 《installation screw》

10.1 Model of list

Series No.	Model No.	Pick-Up	SPINDLE MOTOR	Loading motor:	Sled motor:
1	DL-06L	PVR-520T (MITSUMI)	CCM03-030R1-26 O (Moretech)	WFF-050SB-102 00	WRF-300CA-09 600
2	DL-06LH	HOP-1200 (HITACHI)	Same as above	Same as above	Same as above
3	DL-06H	HOP-1200 (HITACHI)	Same as above	Same as above	Same as above
4	DL-06LS	SF-HD62(65) (SANYO)	Same as above	Same as above	Same as above
5	DL-06LS-M	SF-HD62 (65) (SANYO)	Same as above	Same as above	Same as above
6	DL-06LW	PVR-502W (MITSUMI)	Same as above	Same as above	Same as above

TFT LCD Preliminary Specification

MODEL NO.: V270B1 - L01

LCD TV Head Division			
AVP	郭振隆		

QRA Dept.	TVHD / PDD		
	DDIII	DDII	DDI
Approval	Approval	Approval	Approval
陳永一	李汪洋	藍文錦	林文聰

LCD TV Marketing and Product Management Division	
Product Manager	陳立宜 謝芳宜

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REVISION HISTORY

Version	Date	Page (New)	Section	Description
Ver 1.0	Jun. 15,'05	All	All	Preliminary Specification was first issued.

1. GENERAL DESCRIPTION

1.1 OVERVIEW

V270B1- L01 is a TFT Liquid Crystal Display module with 14-CCFL Backlight unit and 1ch-LVDS interface. The display diagonal is 27". This module supports 1366 x 768 WXGA format and can display true 16.7M colors(8-bits colors). The inverter module for backlight is built-in.

1.2 FEATURES

- Excellent brightness (550 nits)
- Ultra high contrast ratio (1000:1)
- Fast response time (8ms)
- High color saturation NTSC 75%
- WXGA (1366 x 768 pixels) resolution
- DE (Data Enable) only mode
- LVDS (Low Voltage Differential Signaling) interface
- Optimized response time for both 50/60 Hz frame rate
- Ultra wide viewing angle: 176(H)/176(V) (CR>20) Super MVA technology
- 180 degree rotation display option
- Low color shift function option
- Color reproduction (Nature color)

1.3 APPLICATION

- TFT LCD TVs
- High brightness, multi-media displays
-

1.4 GENERAL SPECIFICATIONS

Item	Specification	Unit	Note
Active Area	596.259 (H) x 335.232 (V) (27" diagonal)	mm	(1)
Bezel Opening Area	603.22 (H) x 341.98 (V)	mm	
Driver Element	a-si TFT active matrix	-	
Pixel Number	1366 x R.G.B. x 768	pixel	
Pixel Pitch (Sub Pixel)	0.1460 (H) x 0.4365 (V)	mm	
Pixel Arrangement	RGB vertical stripe	-	
Display Colors	16.7M	color	
Display Operation Mode	Transmissive mode / Normally black	-	
Surface Treatment	Hardness : 3H, Haze : 40% Anti-reflective coating < 2% reflection	-	

1.5 MECHANICAL SPECIFICATIONS

Item	Min.	Typ.	Max.	Unit	Note
Module Size	Horizontal(H)	636.85	637.55	638.25	mm
	Vertical(V)	379.1	379.8	380.5	mm
	Depth(D)	33.9	35.4	36.9	mm
	Depth(D)	39.2	40.7	42.2	mm
Weight	3700	4000	4300	g	

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

2. ABSOLUTE MAXIMUM RATINGS

2.1 ABSOLUTE RATINGS OF ENVIRONMENT

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T _{ST}	-20	+60	°C	(1)
Operating Ambient Temperature	T _{OP}	0	+50	°C	(1), (2)
Shock (Non-Operating)	S _{NOP}	-	50	G	(3), (5)
Vibration (Non-Operating)	V _{NOP}	-	1.0	G	(4), (5)

Note (1) Temperature and relative humidity range is shown in the figure below.

(a) 90 %RH Max. (Ta ≤ 40 °C).

(b) Wet-bulb temperature should be 39 °C Max. (Ta > 40 °C).

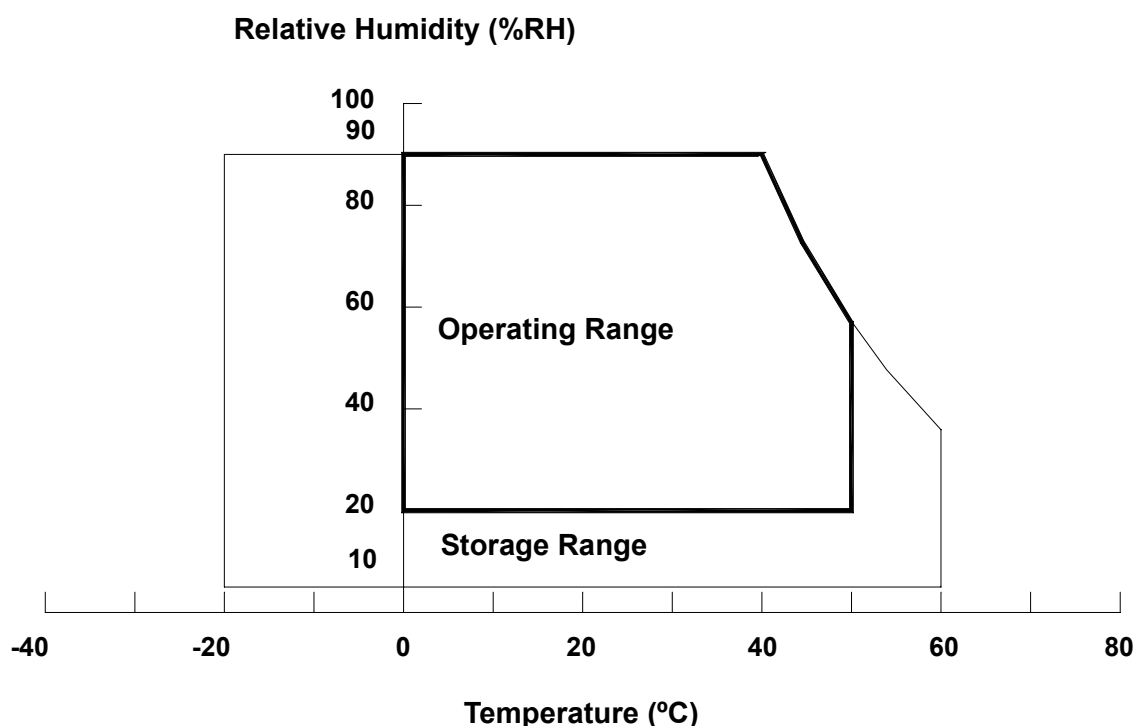
(c) No condensation.

Note (2) The maximum operating temperature is based on the test condition that the surface temperature of display area is less than or equal to 60 °C with LCD module alone in a temperature controlled chamber. Thermal management should be considered in final product design to prevent the surface temperature of display area from being over 60 °C. The range of operating temperature may degrade in case of improper thermal management in final product design.

Note (3) 11 ms, half sine wave, 1 time for ± X, ± Y, ± Z.

Note (4) 10 ~ 500 Hz, 10 min, 1 time each X, Y, Z.

Note (5) At testing Vibration and Shock, the fixture in holding the module has to be hard and rigid enough so that the module would not be twisted or bent by the fixture.



2.2 ELECTRICAL ABSOLUTE RATINGS

2.2.1 TFT LCD MODULE

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Power Supply Voltage	V _{CC}	-0.3	6.0	V	(1)
Input Signal Voltage	V _{IN}	-0.3	3.6	V	

2.2.2 BACKLIGHT UNIT

Item	Symbol	Test Condition	Min.	Type	Max.	Unit	Note
Lamp Voltage	V _W	Ta = 25	-	-	3000	V _{RMS}	
Power Supply Voltage	V _{BL}	-	0	-	30	V	(1)
Control Signal Level	-	-	-0.3	-	7	V	(1), (3)

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Functional operation should be restricted to the conditions described under normal operating conditions.

Note (2) No moisture condensation or freezing.

Note (3) The control signals includes Backlight On/Off Control, Internal PWM Control, External PWM Control and Internal/External PWM Selection.

3. ELECTRICAL CHARACTERISTICS

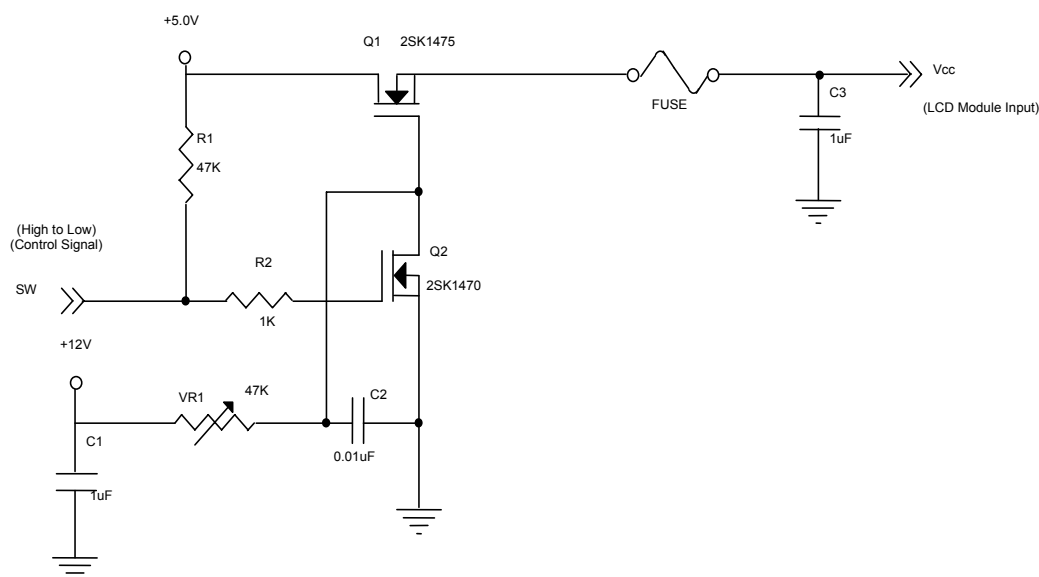
3.1 TFT LCD MODULE

 $T_a = 25 \pm 2^\circ\text{C}$

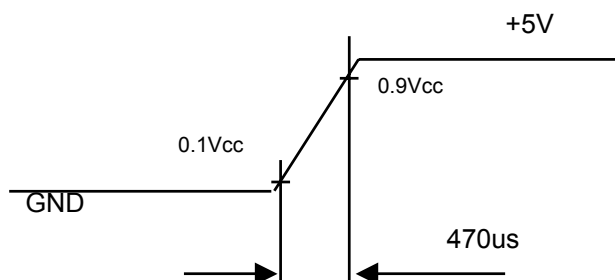
Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Power Supply Voltage		V_{CC}	4.5	5.0	5.5	V	(1)
Power Supply Ripple Voltage		V_{RP}	-	-	150	mV	
Rush Current		I_{RUSH}	-	-	3.0	A	(2)
Power Supply Current	White	I_{CC}	-	1.8	-	A	(3)
	Black		-	1.2	-	A	
	Vertical Stripe		-	1.65	-	A	
LVDS Interface	Differential Input High Threshold Voltage	V_{LVTH}	-	-	+100	mV	
	Differential Input Low Threshold Voltage	V_{LVTL}	-100	-	-	mV	
	Common Input Voltage	V_{LVC}	1.125	1.25	1.375	V	
	Terminating Resistor	R_T		100		ohm	
CMOS interface	Input High Threshold Voltage	V_{IH}	2.7	-	3.3	V	
	Input Low Threshold Voltage	V_{IL}	0	-	0.7	V	

Note (1) The module should be always operated within above ranges.

Note (2) Measurement Conditions:

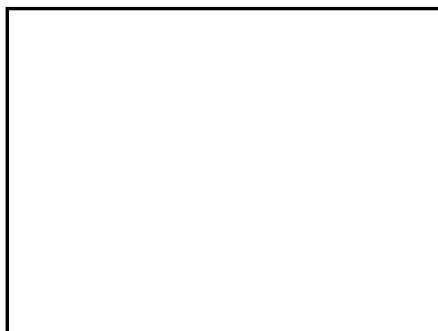


Vcc rising time is 470us



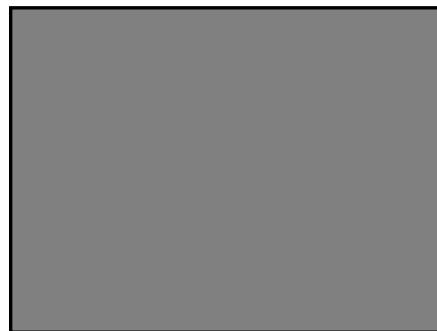
Note (3) The specified power supply current is under the conditions at $V_{CC} = 5\text{ V}$, $T_a = 25 \pm 2\text{ }^{\circ}\text{C}$, $f_v = 60\text{ Hz}$, whereas a power dissipation check pattern below is displayed.

a. White Pattern



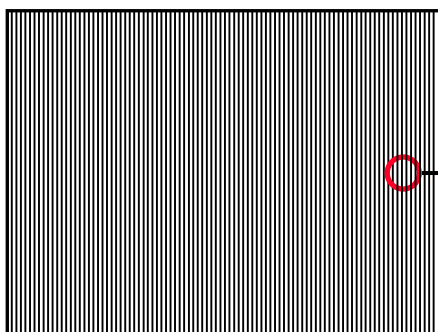
Active Area

b. Black Pattern

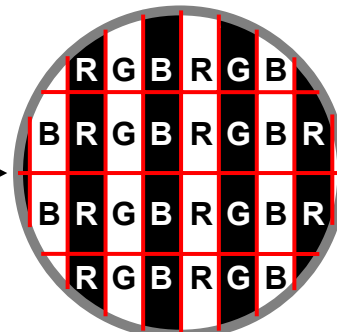


Active Area

c. Vertical Stripe Pattern



Active Area



3.2 BACKLIGHT INVERTER UNIT

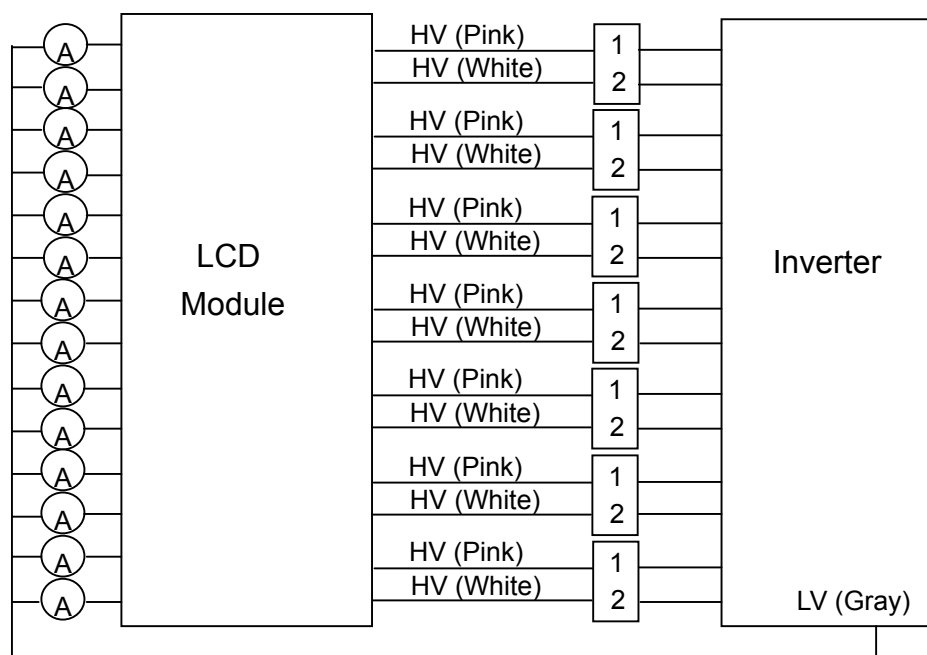
3.2.1 CCFL (Cold Cathode Fluorescent Lamp) CHARACTERISTICS ($T_a = 25 \pm 2\text{ }^{\circ}\text{C}$)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Lamp Voltage	V_W	-	1120	-	V_{RMS}	$I_L = 4.7\text{mA}$
Lamp Current	I_L	4.2	4.7	5.2	mA_{RMS}	(1)
Lamp Starting Voltage	V_S	-	-	1650	V_{RMS}	(2), $T_a = 0\text{ }^{\circ}\text{C}$
		-	-	1500	V_{RMS}	(2), $T_a = 25\text{ }^{\circ}\text{C}$
Operating Frequency	F_O	50	-	70	KHz	(3)
Lamp Life Time	L_{BL}	50,000	60,000	-	Hrs	(4)

3.2.2 INVERTER CHARACTERISTICS (Ta = 25 ± 2 °C)

Parameter	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Consumption	P _{BL}	-	92	-	W	(5), I _L = 4.7mA
Power Supply Voltage	V _{BL}	22.8	24	25.2	V _{DC}	
Power Supply Current	I _{BL}	-	3.8	-	A	Non Dimming
Input Ripple Noise	-	-	-	500	mV _{P-P}	V _{BL} = 22.8V
Backlight Turn on Voltage	V _{BS}	1790	-	-	V _{RMS}	Ta = 0 °C
		1200	-	-	V _{RMS}	Ta = 25 °C
Oscillating Frequency	F _W	53	56	59	kHz	
Dimming Frequency	F _B	150	160	170	Hz	
Minimum Duty Ratio	D _{MIN}	-	10	-	%	

Note (1) Lamp current is measured by utilizing high frequency current meters as shown below:



Note (2) The lamp starting voltage V_s should be applied to the lamp for more than 1 second under starting up duration. Otherwise the lamp could not be lighted on completed.

Note (3) The lamp frequency may produce interference with horizontal synchronous frequency from the display, and this may cause line flow on the display. In order to avoid interference, the lamp frequency should be detached from the horizontal synchronous frequency and its harmonics as far as possible.

Note (4) The life time of a lamp is defined as when the brightness is larger than 50% of its original value and the effective discharge length is longer than 80% of its original length (Effective discharge length is defined as an area that has equal to or more than 70% brightness compared to the brightness at the center point.) as the time in which it continues to operate under the condition $T_a = 25 \pm 2$ and $I_L = 4.2 \sim 5.2 \text{ mA}_{\text{RMS}}$.

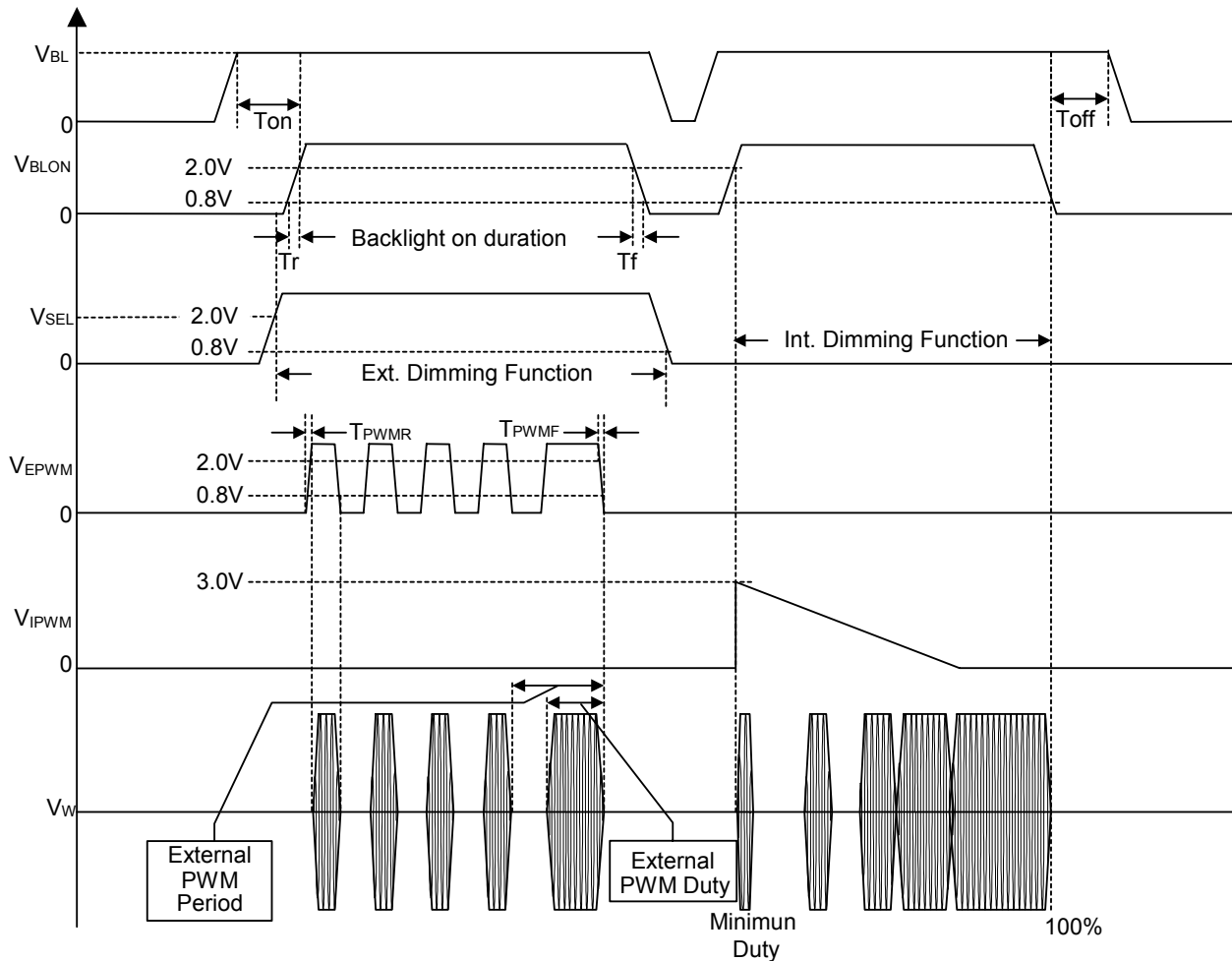
Note (5) The power supply capacity should be higher than the total inverter power consumption P_{BL} . Since the pulse width modulation (PWM) mode was applied for backlight dimming, the driving current changed as PWM duty on and off. The transient response of power supply should be considered for the changing loading when inverter dimming.

3.2.3 INVERTER INTERFACE CHARACTERISTICS

Item		Symbol	Test Condition	Min.	Typ.	Max.	Unit	Note
On/Off Control Voltage	ON	V_{BLON}	-	2.0	-	5.0	V	
	OFF		-	0	-	0.8	V	
Internal/External PWM Select Voltage	HI	V_{SEL}	-	2.0	-	5.0	V	
	LO		-	0	-	0.8	V	
Internal PWM Control Voltage	MAX	V_{IPWM}	$V_{\text{SEL}} = \text{L}$	-	-	3.0	V	minimum duty ratio
	MIN			-	0	-	V	maximum duty ratio
External PWM Control Voltage	HI	V_{EPWM}	$V_{\text{SEL}} = \text{H}$	2.0	-	5.0	V	duty on
	LO			0	-	0.8	V	duty off
Control Signal Rising Time		T_r	-	-	-	100	ms	
Control Signal Falling Time		T_f	-	-	-	100	ms	
PWM Signal Rising Time		T_{PWMR}	-	-	-	50	us	
PWM Signal Falling Time		T_{PWMF}	-	-	-	50	us	
Input impedance		R_{IN}	-	1	-	-	M	
BLON Delay Time		T_{on}	-	1	-	-	ms	
BLON Off Time		T_{off}	-	1	-	-	ms	

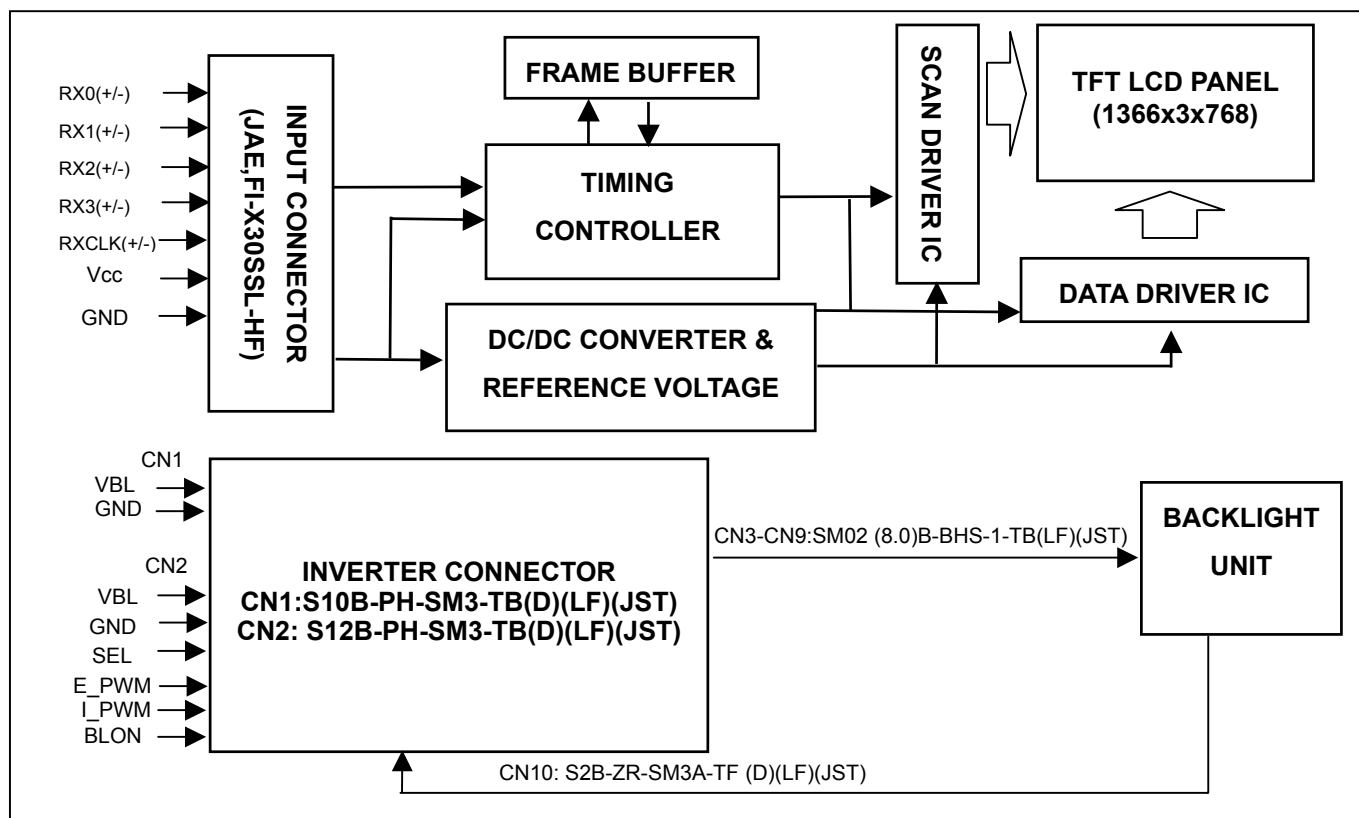
Note (1) The SEL signal should be valid before backlight turns on by BLON signal. It is inhibited to change the internal/external PWM selection (SEL) during backlight turn on period.

Note (2) The power sequence and control signal timing are shown as the following figure.



4. BLOCK DIAGRAM

4.1 TFT LCD MODULE



5. INTERFACE PIN CONNECTION

5.1 TFT LCD MODULE

CNF1 Connector Pin Assignment

Pin No.	Symbol	Description	Note
1	GND	Ground	
2	RPF	Display Rotation	(3)
3	SELLVDS	Select LVDS data format	(5)
4	NC	No Connection	(2)
5	NC	No Connection	
6	ODSEL	Overdrive Lookup Table Selection	(4)
7	EN LCS	Low Color Shift	(6)
8	GND	Ground	
9	RX0-	Negative transmission data of pixel 0	
10	RX0+	Positive transmission data of pixel 0	
11	RX1-	Negative transmission data of pixel 1	
12	RX1+	Positive transmission data of pixel 1	
13	RX2-	Negative transmission data of pixel 2	
14	RX2+	Positive transmission data of pixel 2	
15	RXCLK-	Negative of clock	
16	RXCLK+	Positive of clock	
17	RX3-	Negative transmission data of pixel 3	
18	RX3+	Positive transmission data of pixel 3	
19	GND	Ground	
20	GND	Ground	
21	GND	Ground	
22	GND	Ground	
23	GND	Ground	
24	GND	Ground	
25	GND	Ground	
26	VCC	Power supply: +5V	
27	VCC	Power supply: +5V	
28	VCC	Power supply: +5V	
29	VCC	Power supply: +5V	
30	VCC	Power supply: +5V	

Note (1) Connector Part No.: FI-X30SSL-HF(JAE) or compatible

Note (2) Reserved for internal use. Left it open.

Note (3) Low : normal display (default), High : display with 180 degree rotation

Note (4) Overdrive lookup table selection. The Overdrive lookup table should be selected in accordance to the frame rate to optimize image quality.

ODSEL	Note
L	Lookup table was optimized for 60 Hz frame rate.
H	Lookup table was optimized for 50 Hz frame rate.

Note (5) Please refer to 5.5 LVDS INTERFACE (Page 17)

Note (6) Enable Low color shift function.

EN LCS	Note
L	Low color shift off
H	Low color shift on

5.2 BACKLIGHT UNIT

The pin configuration for the housing and leader wire is shown in the table below.

CN3-CN9 (Housing): BHR-03VS-1 (JST)

Pin No.	Symbol	Description	Wire Color
1	HV	High Voltage	Pink
2	HV	High Voltage	White

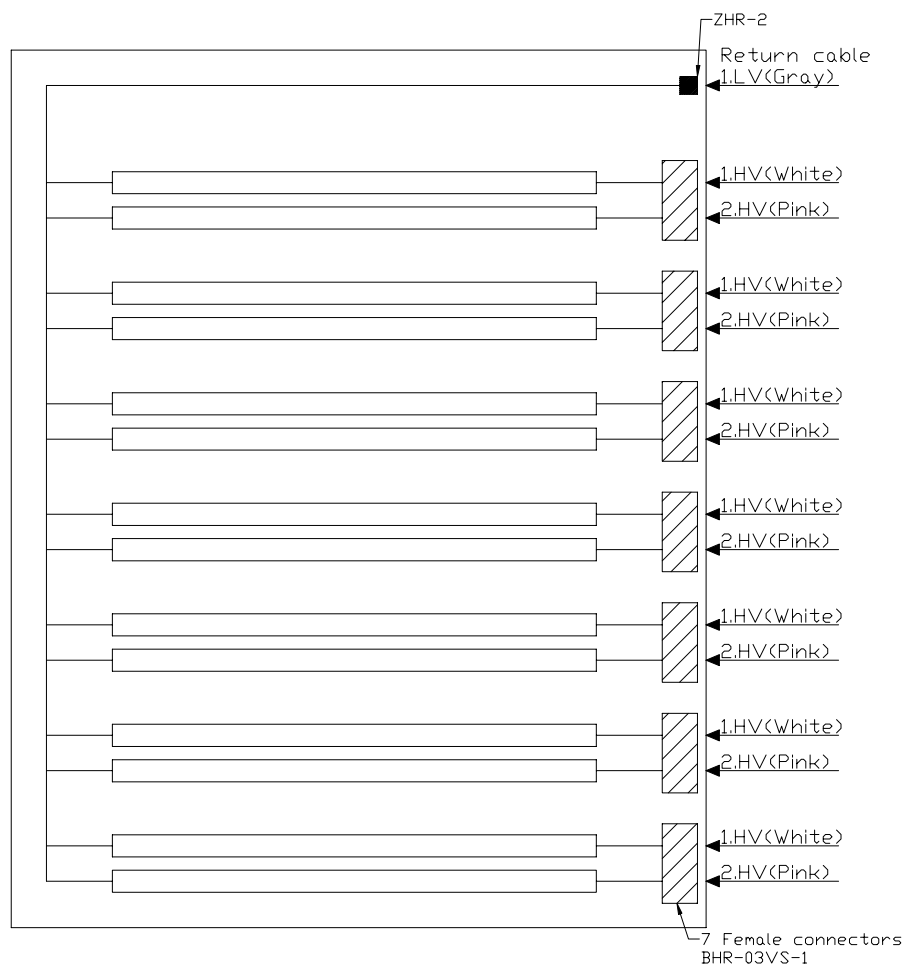
Note (1) The backlight interface housing for high voltage side is a model BHR-03VS-1, manufactured by JST.

The mating header on inverter part number is SM02(8.0)B-BHS-1-TB(LF) or equivalent.

CN10 (Housing): ZHR-2 (JST) or equivalent

Pin No.	Symbol	Description	Wire Color
1	LV	Low Voltage (+)	Gray
2	NC	No Connection	-

Note (2) The backlight interface housing and return cable for low voltage side is a model ZHR-2 , manufactured by JST or equivalent. The mating header on inverter part number is S2B-ZR-SM3A-TF(D)(LF) or equivalent.



5.3 INVERTER UNIT

CN1(Header):S10B-PH-SM3-TB(D)(LF)(JST) or equivalent.

Pin	Name	Description
1	VBL	+24V Power input
2		
3		
4		
5		
6	GND	Ground
7		
8		
9		
10		

CN2(Header): S12B-PH-SM3-TB(D)(LF)(JST) or equivalent.

Pin	Name	Description
1	VBL	+24V Power input
2		
3		
4		
5		
6	GND	Ground
7		
8		
9	SEL	Internal/external PWM selection High : external dimming Low : internal dimming
10	E_PWM	External PWM control signal E_PWM should be connected to low when internal PWM was selected (SEL = low).
11	I_PWM	Internal PWM control signal I_PWM should be connected to ground when external PWM was selected (SEL = high).
12	BLON	Backlight on/off control

CN3-CN9(Header): SM02(8.0)B-BHS-1-TB(LF)(JST) or equivalent

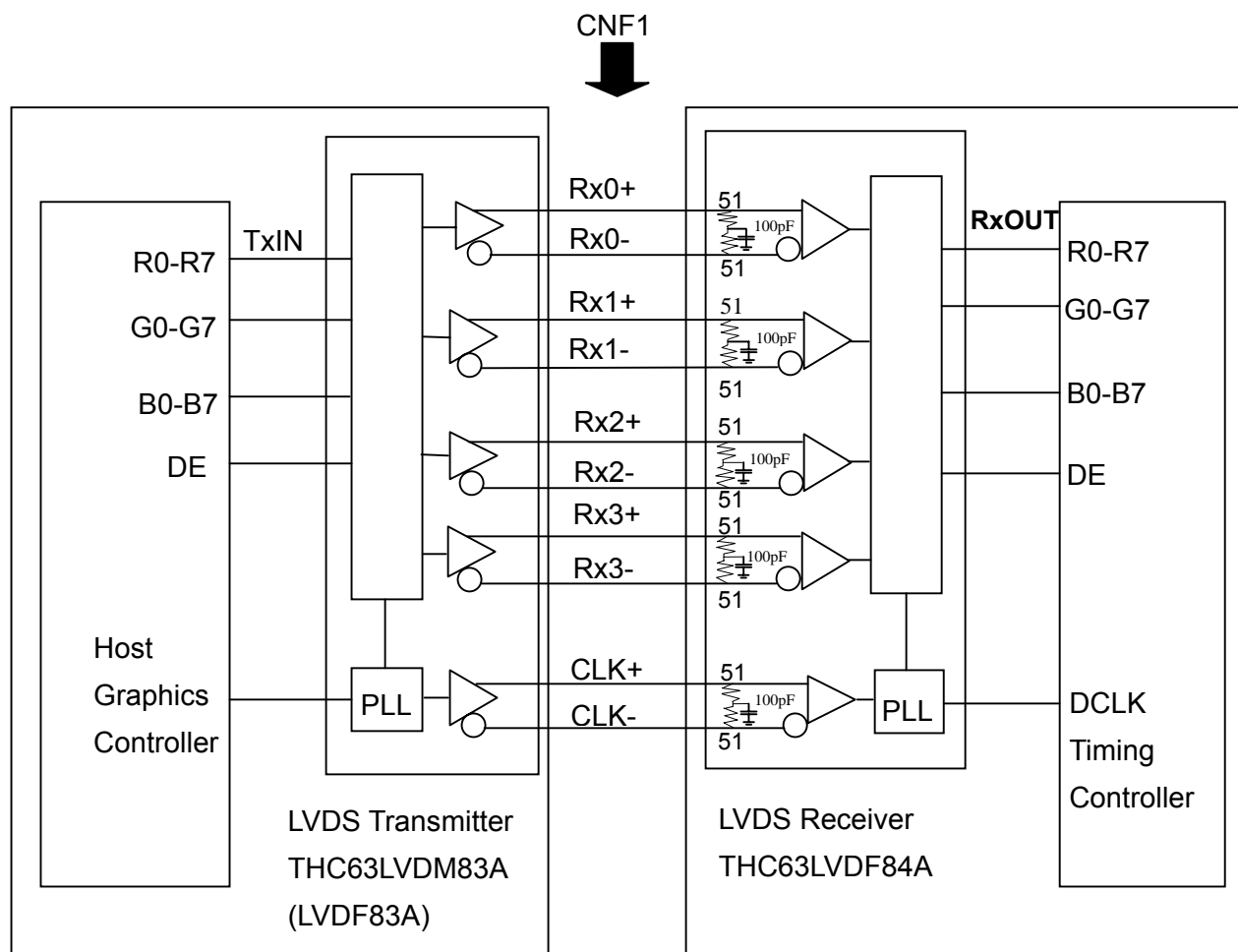
Pin	Name	Description
1	CCFL HOT	CCFL high voltage
2	CCFL HOT	CCFL high voltage

CN10(Header): S2B-ZR-SM3A-TF(D)(LF)(JST) or equivalent

Pin	Name	Description
1	CCFL COLD	CCFL low voltage
2	NC	-

Note (1) Floating of any control signal is not allowed.

5.4 BLOCK DIAGRAM OF INTERFACE



R0~R7 : Pixel R Data ,
 G0~G7 : Pixel G Data ,
 B0~B7 : Pixel B Data ,
 DE : Data enable signal

Note (1) The system must have the transmitter to drive the module.

Note (2) LVDS cable impedance shall be 50 ohms per signal line or about 100 ohms per twist-pair line when it is used differentially.

5.5 LVDS INTERFACE

	SIGNAL		TRANSMITTER THC63LVDM83A		INTERFACE CONNECTOR		RECEIVER THC63LVDF84A		TFT CONTROL INPUT	
	SELLVDS =L	SELLVDS =H	PIN	INPUT	Host	TFT-LCD	PIN	OUTPUT	SELLVDS =L	SELLVDS =H
24 bit	R0	R2	51	TxIN0	TA OUT0+	Rx 0+	27	Rx OUT0	R0	R2
	R1	R3	52	TxIN1			29	Rx OUT1	R1	R3
	R2	R4	54	TxIN2			30	Rx OUT2	R2	R4
	R3	R5	55	TxIN3			32	Rx OUT3	R3	R5
	R4	R6	56	TxIN4	TA OUT0-	Rx 0-	33	Rx OUT4	R4	R6
	R5	R7	3	TxIN6			35	Rx OUT6	R5	R7
	G0	G2	4	TxIN7			37	Rx OUT7	G0	G2
	G1	G3	6	TxIN8			38	Rx OUT8	G1	G3
	G2	G4	7	TxIN9	TA OUT1+	Rx 1+	39	Rx OUT9	G2	G4
	G3	G5	11	TxIN12			43	Rx OUT12	G3	G5
	G4	G6	12	TxIN13			45	Rx OUT13	G4	G6
	G5	G7	14	TxIN14			46	Rx OUT14	G5	G7
	B0	B2	15	TxIN15	TA OUT1-	Rx 1-	47	Rx OUT15	B0	B2
	B1	B3	19	TxIN18			51	Rx OUT18	B1	B3
	B2	B4	20	TxIN19			53	Rx OUT19	B2	B4
	B3	B5	22	TxIN20			54	Rx OUT20	B3	B5
	B4	B6	23	TxIN21	TA OUT2+	Rx 2+	55	Rx OUT21	B4	B6
	B5	B7	24	TxIN22			1	Rx OUT22	B5	B7
	DE	DE	30	TxIN26			6	Rx OUT26	DE	DE
	R6	R0	50	TxIN27	TA OUT2-	Rx 2-	7	Rx OUT27	R6	R0
	R7	R1	2	TxIN5			34	Rx OUT5	R7	R1
	G6	G0	8	TxIN10			41	Rx OUT10	G6	G0
	G7	G1	10	TxIN11			42	Rx OUT11	G7	G1
	B6	B0	16	TxIN16	TA OUT3+	Rx 3+	49	Rx OUT16	B6	B0
	B7	B1	18	TxIN17			50	Rx OUT17	B7	B1
	RSVD 1	RSVD 1	25	TxIN23			2	Rx OUT23	NC	NC
	RSVD 2	RSVD 2	27	TxIN24	TA OUT3-	Rx 3-	3	Rx OUT24	NC	NC
	RSVD 3	RSVD 3	28	TxIN25			5	Rx OUT25	NC	NC
		DCLK	31	TxCLK IN	TxCLK OUT+	RxCLK IN+	26	RxCLK OUT	DCLK	
					TxCLK OUT-	RxCLK IN-				

R0~R7: Pixel R Data (7; MSB, 0; LSB)

G0~G7: Pixel G Data (7; MSB, 0; LSB)

B0~B7: Pixel B Data (7; MSB, 0; LSB)

DE: Data enable signal

Notes(1) RSVD(reserved)pins on the transmitter shall be "H" or "L".

5.6 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 8-bit gray scale data input for the color. The higher the binary input, the brighter the color. The table below provides the assignment of color versus data input.

Color		Data Signal																							
		Red								Green								Blue							
		R7	R6	R5	R4	R3	R2	R1	R0	G7	G6	G5	G4	G3	G2	G1	G0	B7	B6	B5	B4	B3	B2	B1	B0
Basic Colors	Black	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	Blue	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Cyan	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Magenta	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1
	Yellow	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
	White	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Gray Scale Of Red	Red(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(1)	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(2)	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Red(253)	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(254)	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Red(255)	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gray Scale Of Green	Green(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Green(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
	Green(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Green(253)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1	0	0	0	0	0	0	0	0
	Green(254)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0
	Green(255)	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	0	0	0	0	0
Gray Scale Of Blue	Blue(0) / Dark	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Blue(1)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
	Blue(2)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:
	Blue(253)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	0	1
	Blue(254)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	0
	Blue(255)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1	1	1

Note (1) 0: Low Level Voltage, 1: High Level Voltage

6. INTERFACE TIMING

6.1 INPUT SIGNAL TIMING SPECIFICATIONS

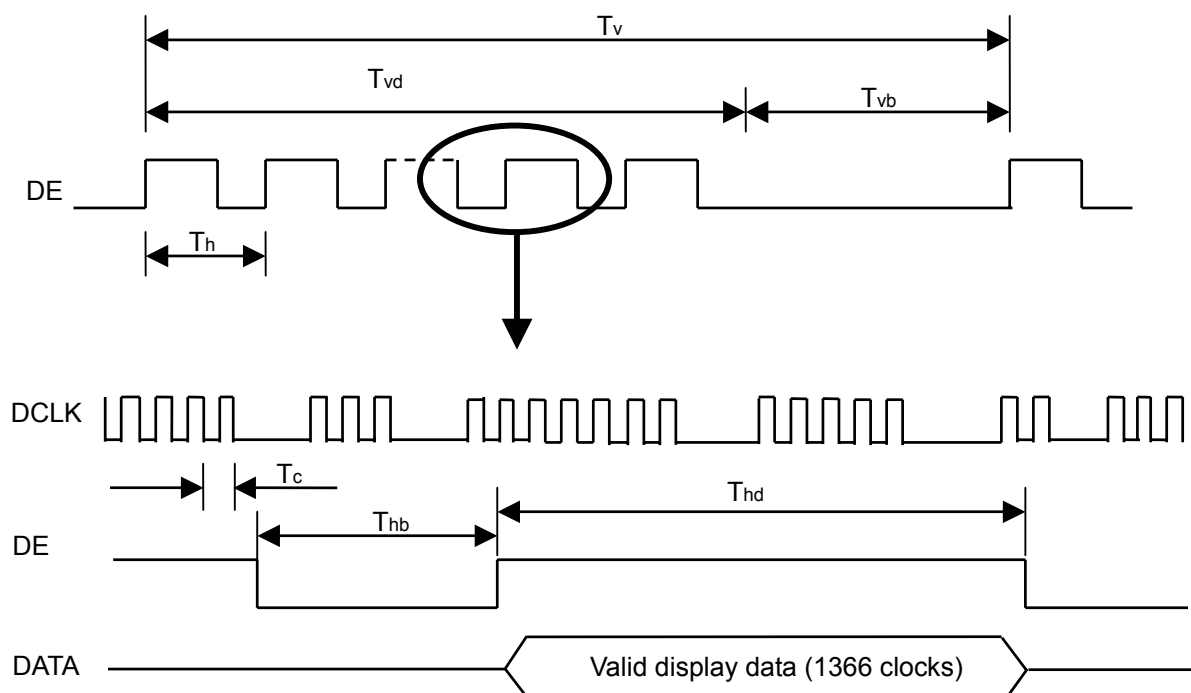
The input signal timing specifications are shown as the following table and timing diagram.

Signal	Item	Symbol	Min.	Typ.	Max.	Unit	Note
LVDS Receiver Clock	Frequency	1/Tc	60	86	88	MHz	
	Input cycle to cycle jitter	Trcl	-	-	200	ps	
LVDS Receiver Data	Setup Time	Tlvsu	600	-	-	ps	
	Hold Time	Tlvhd	600	-	-	ps	
Vertical Active Display Term	Frame Rate	Fr5	47	50	53	Hz	(2)
		Fr6	57	60	63	Hz	
	Total	Tv	770	795	888	Th	Tv=Tvd+Tvb
	Display	Tvd	768	768	768	Th	-
	Blank	Tvb	2	27	120	Th	-
Horizontal Active Display Term	Total	Th	1436	1798	1936	Tc	Th=Thd+Thb
	Display	Thd	1366	1366	1366	Tc	-
	Blank	Thb	70	432	570	Tc	-

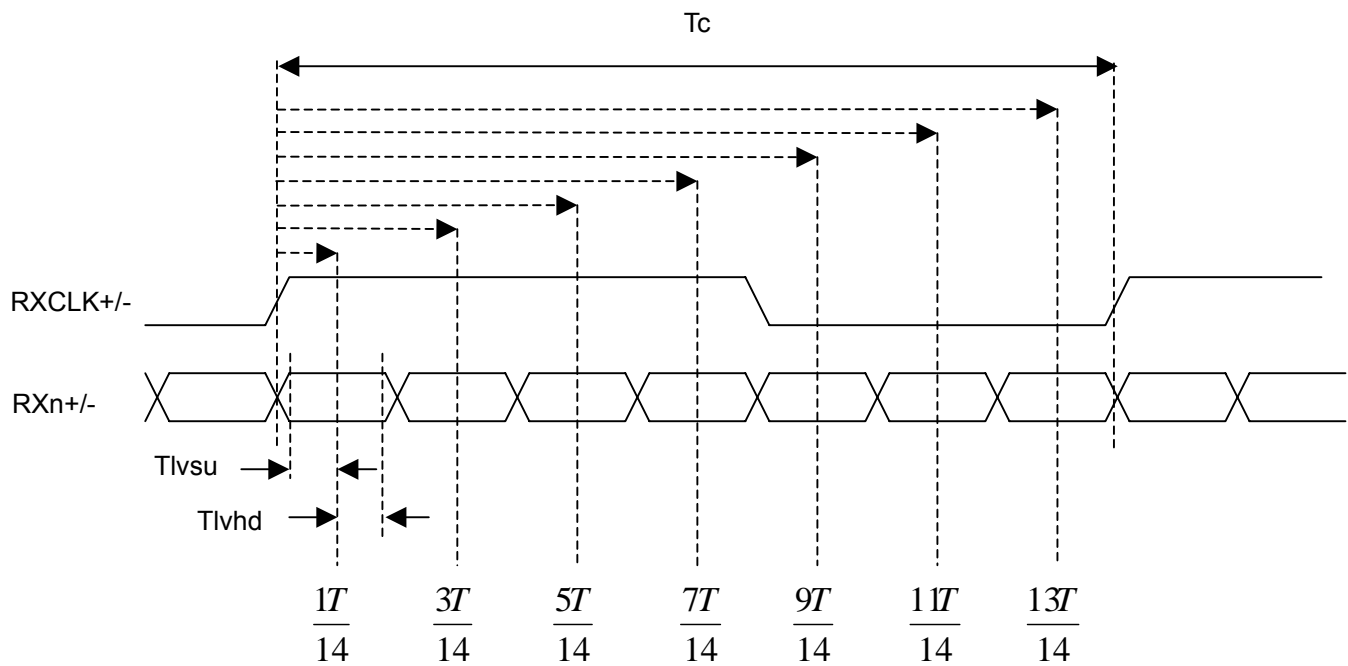
Note (1) Since this module is operated in DE only mode, Hsync and Vsync input signals should be set to low logic level. Otherwise, this module would operate abnormally.

(2) Please refer to 5.1 for detail information.

INPUT SIGNAL TIMING DIAGRAM

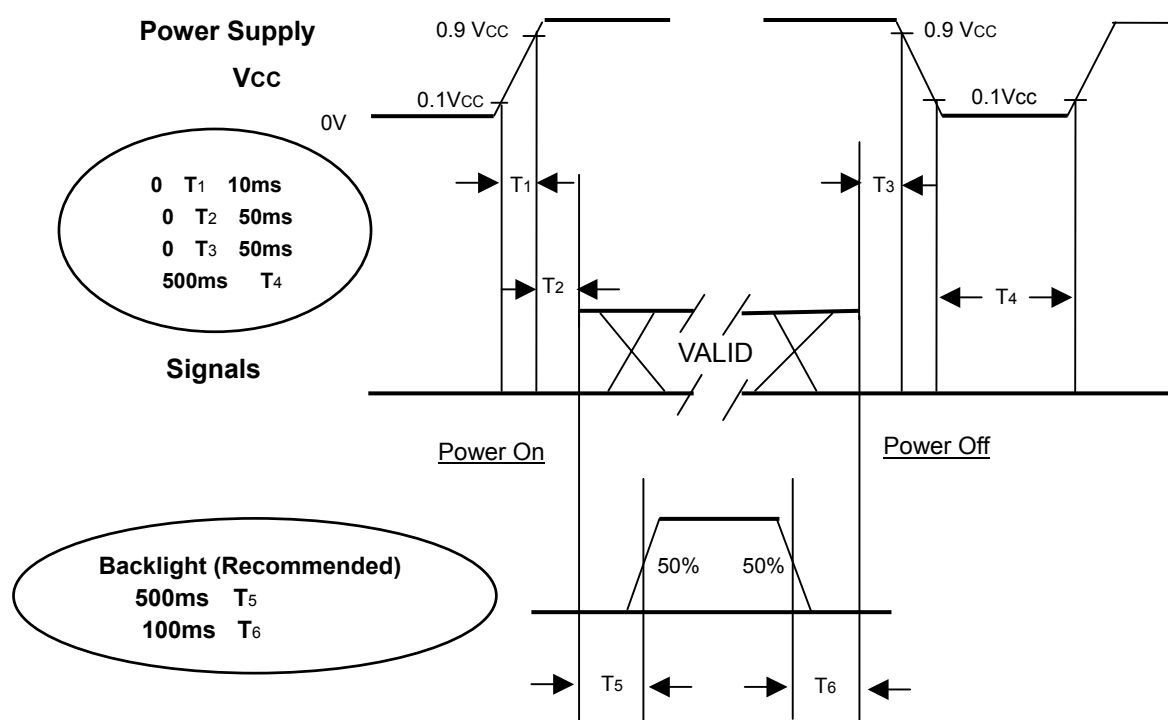


LVDS RECEIVER INTERFACE TIMING DIAGRAM



6.2 POWER ON/OFF SEQUENCE

To prevent a latch-up or DC operation of LCD module, the power on/off sequence should be as the diagram below.



Power ON/OFF Sequence

Note (1) The supply voltage of the external system for the module input should follow the definition of Vcc.

Note (2) Apply the lamp voltage within the LCD operation range. When the backlight turns on before the LCD operation or the LCD turns off before the backlight turns off, the display may momentarily become abnormal screen.

Note (3) In case of Vcc is in off level, please keep the level of input signals on the low or high impedance.

Note (4) T4 should be measured after the module has been fully discharged between power off and on period.

Note (5) Interface signal shall not be kept at high impedance when the power is on.

7. OPTICAL CHARACTERISTICS

7.1 TEST CONDITIONS

Item	Symbol	Value	Unit
Ambient Temperature	Ta	25±2	°C
Ambient Humidity	Ha	50±10	%RH
Supply Voltage	V _{CC}	5.0	V
Input Signal	According to typical value in "3. ELECTRICAL CHARACTERISTICS"		
Lamp Current	I _L	4.7 ± 0.5	mA
Oscillating Frequency (Inverter)	F _W	56 ± 3	KHz

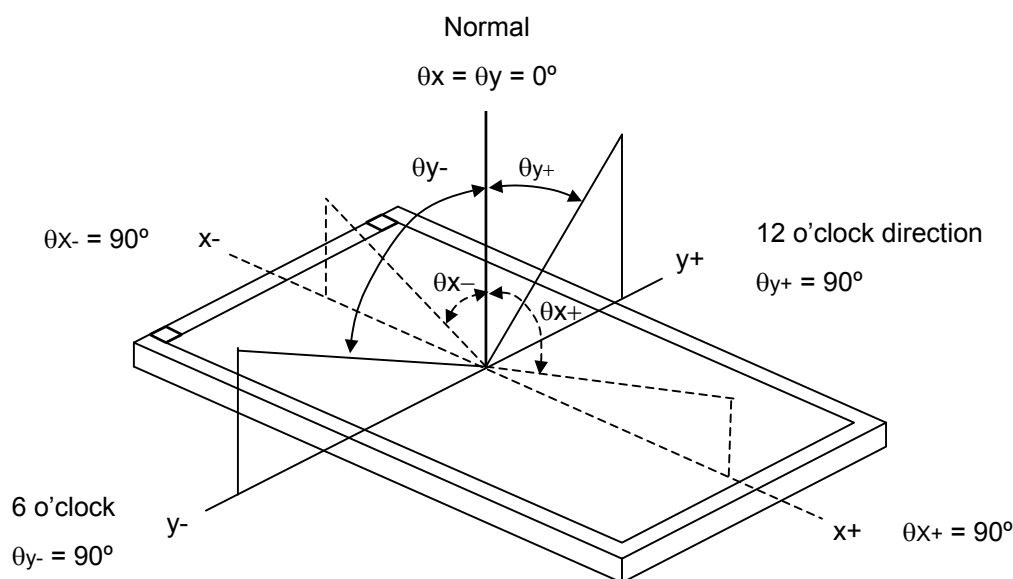
7.2 OPTICAL SPECIFICATIONS

The relative measurement methods of optical characteristics are shown in 7.2. The following items should be measured under the test conditions described in 7.1 and stable environment shown in Note (6).

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	$\theta_x=0^\circ, \theta_Y=0^\circ$ Viewing Normal Angle		(1000)		-	(2)
Response Time		Gray to gray average			(8)		ms	(3)
Center Luminance of White		L _C			(550)		cd/m ²	(4)
White Variation		δW				(1.3)	-	(7)
Cross Talk		CT				(4)	%	(5)
Color Chromaticity	Red	R _x			(0.652)		-	(6)
		R _y			(0.331)		-	
	Green	G _x			(0.275)		-	
		G _y			(0.597)		-	
	Blue	B _x			(0.143)		-	
		B _y			(0.063)		-	
	White	W _x			(0.285)		Target	
		W _y			(0.293)			
Color Gamut		CG			(75)		%	NTSC
Viewing Angle	Horizontal	θ _{x+}	CR≥20		(88)	Deg.	(1)	
		θ _{x-}			(88)			
	Vertical	θ _{y+}			(88)			
		θ _{y-}			(88)			

Note (1) Definition of Viewing Angle (θ_x , θ_y):

Viewing angles are measured by EZ-Contrast 160R (Eldim)



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{255} / L_0$$

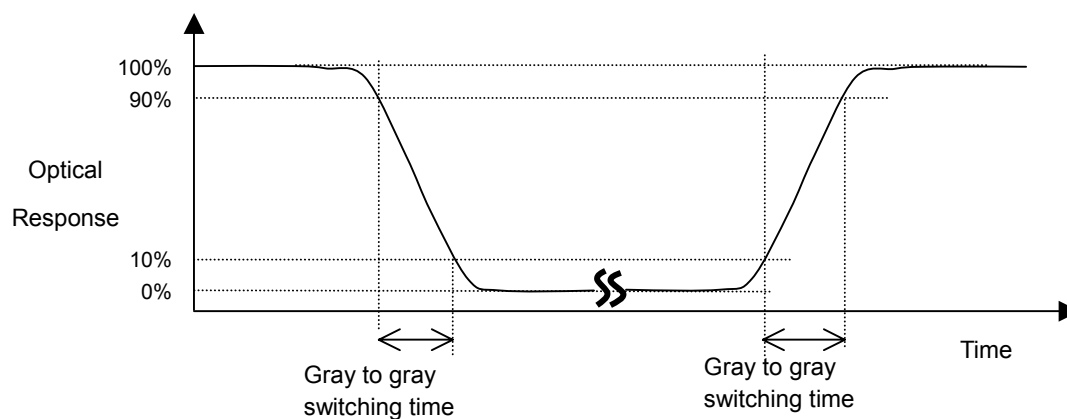
L255: Luminance of gray level 255

L 0: Luminance of gray level 0

$$\text{CR} = \text{CR} (5)$$

CR (X) is corresponding to the Contrast Ratio of the point X at the figure in Note (7).

Note (3) Definition of Gray to Gray Switching Time :



The driving signal means the signal of gray level 0, 63, 127, 191, 255.

Gray to gray average time means the average switching time of gray level 0, 63, 127, 191, 255 to each other .

Note (4) Definition of Luminance of White (L_C , L_{AVE}):

Measure the luminance of gray level 255 at center point and 5 points

$$L_C = L(5)$$

$$L_{AVE} = [L(1) + L(2) + L(3) + L(4) + L(5)] / 5$$

$L(x)$ is corresponding to the luminance of the point X at the figure in Note (7).

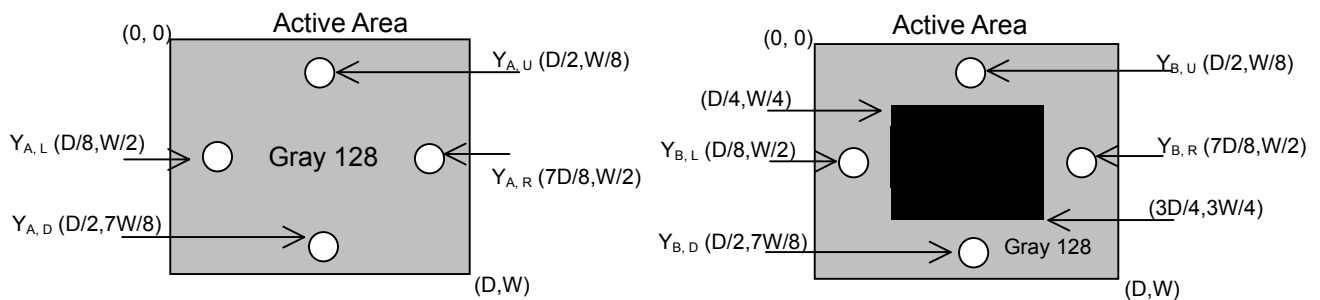
Note (5) Definition of Cross Talk (CT):

$$CT = |Y_B - Y_A| / Y_A \times 100 (\%)$$

Where:

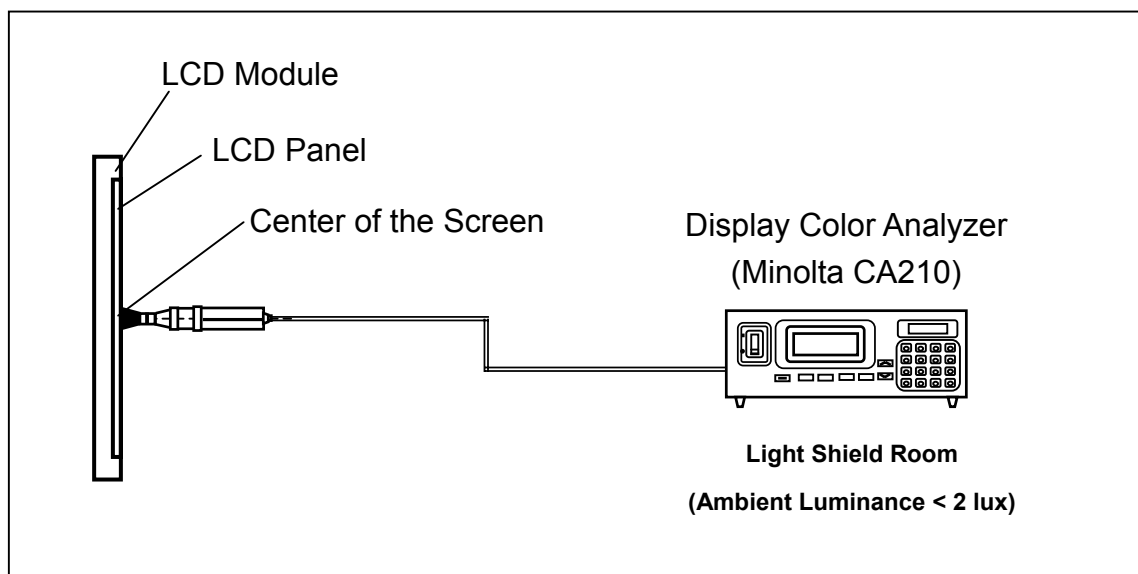
Y_A = Luminance of measured location without gray level 0 pattern (cd/m^2)

Y_B = Luminance of measured location with gray level 0 pattern (cd/m^2)



Note (6) Measurement Setup:

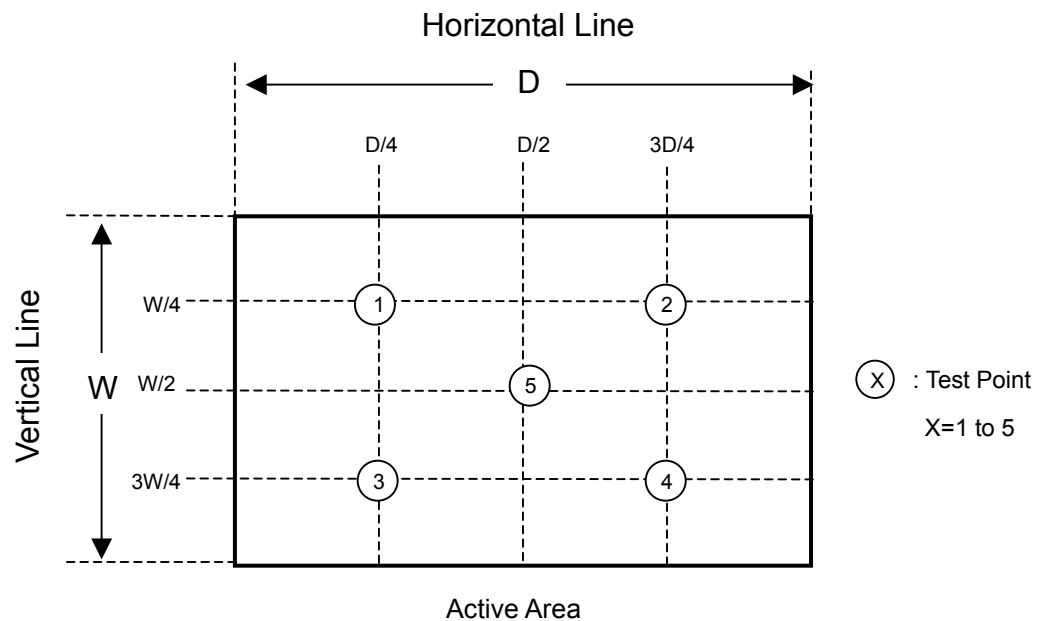
The LCD module should be stabilized at given temperature for 1 hour to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 1 hour in a windless room.



Note (7) Definition of White Variation (δW):

Measure the luminance of gray level 255 at 5 points

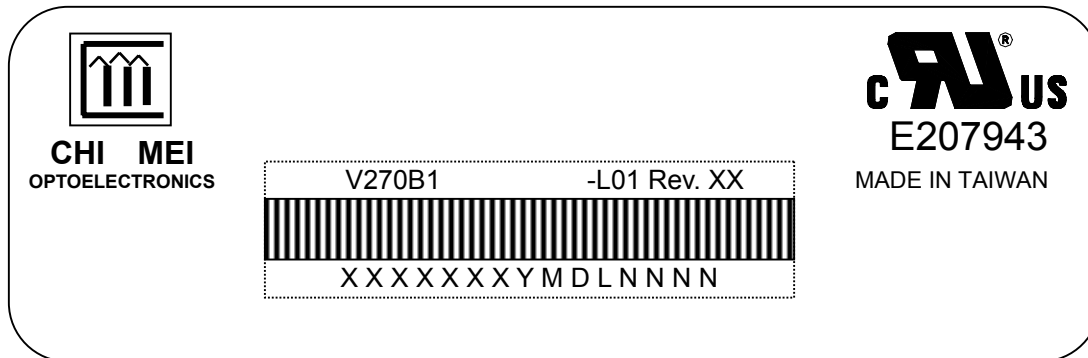
$$\delta W = \text{Maximum} [L(1), L(2), L(3), L(4), L(5)] / \text{Minimum} [L(1), L(2), L(3), L(4), L(5)]$$



8. DEFINITION OF LABELS

8.1 CMO MODULE LABEL

The barcode nameplate is pasted on each module as illustration, and its definitions are as following explanation.



- (a) Model Name: V270B1-L01
- (b) Revision: Rev. XX, for example: A0, A1... B1, B2... or C1, C2...etc.
- (c) Serial ID: XXXXXXYMDLNNNN
- | | |
|--|-------------------|
| | Serial No. |
| | Product Line |
| | Year, Month, Date |
| | CMO Internal Use |
| | CMO Internal Use |
| | Revision |
| | CMO Internal Use |

Serial ID includes the information as below:

- (a) Manufactured Date: Year: 1~9, for 2001~2009
Month: 1~9, A~C, for Jan. ~ Dec.
Day: 1~9, A~Y, for 1st to 31st, exclude I, O, and U.
- (b) Revision Code: Cover all the change
- (c) Serial No.: Manufacturing sequence of product
- (d) Product Line: 1 -> Line1, 2 -> Line 2, ...etc.

9. PACKAGING

9.1 PACKING SPECIFICATIONS

- (1) 4 LCD TV modules / 1 Box
- (2) Box dimensions : 742(L) X 327 (W) X 510 (H)
- (3) Weight : approximately 19Kg (4 modules per box)

9.2 PACKING METHOD

Figures 9-1 and 9-2 are the packing method

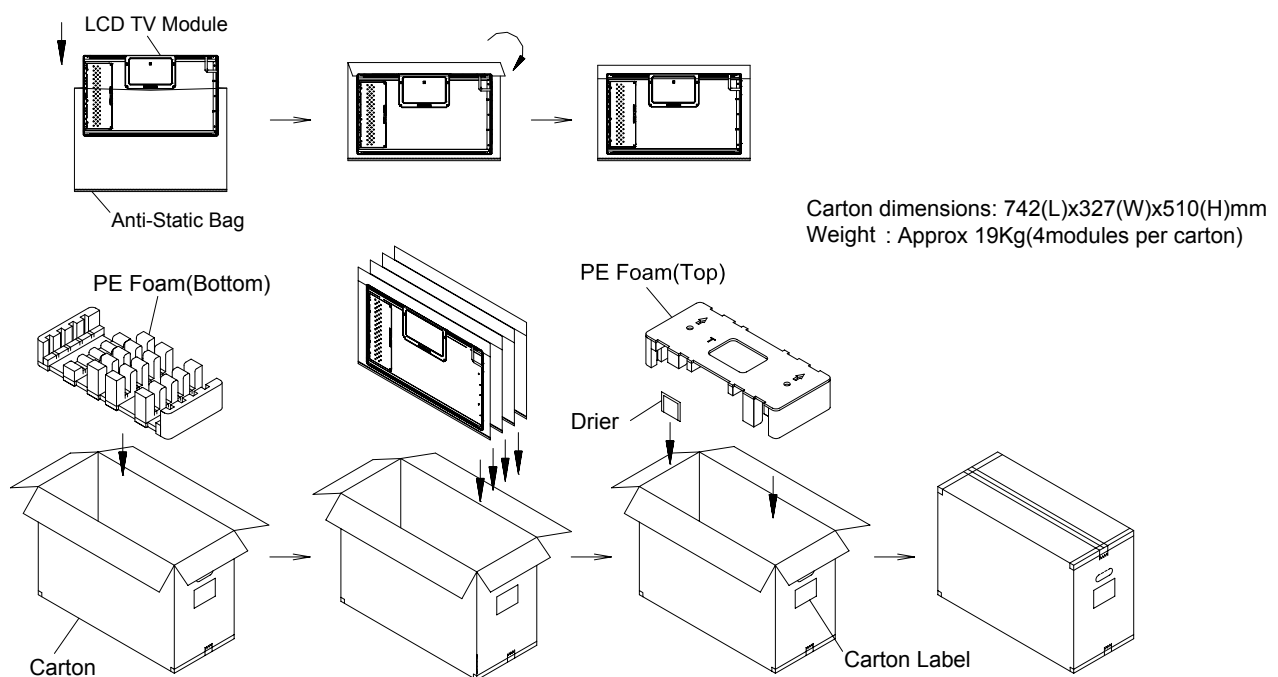


Figure.9-1 packing method

Corner Protector:L1020*50mm*50mm

Pallet:L1100*W1100*H135mm

Corrugated Fiberboard:L1100*W1100mm

Pallet Stack:L1100*W1100*H1160mm

Gross:168kg

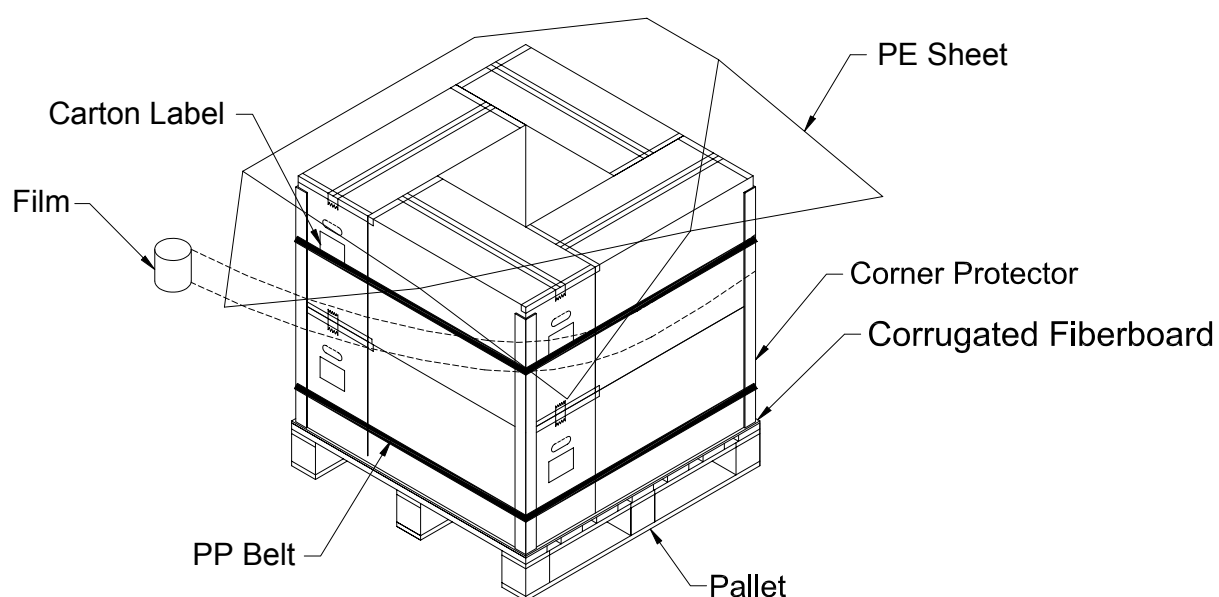


Figure. 9-2 packing method

10. PRECAUTIONS

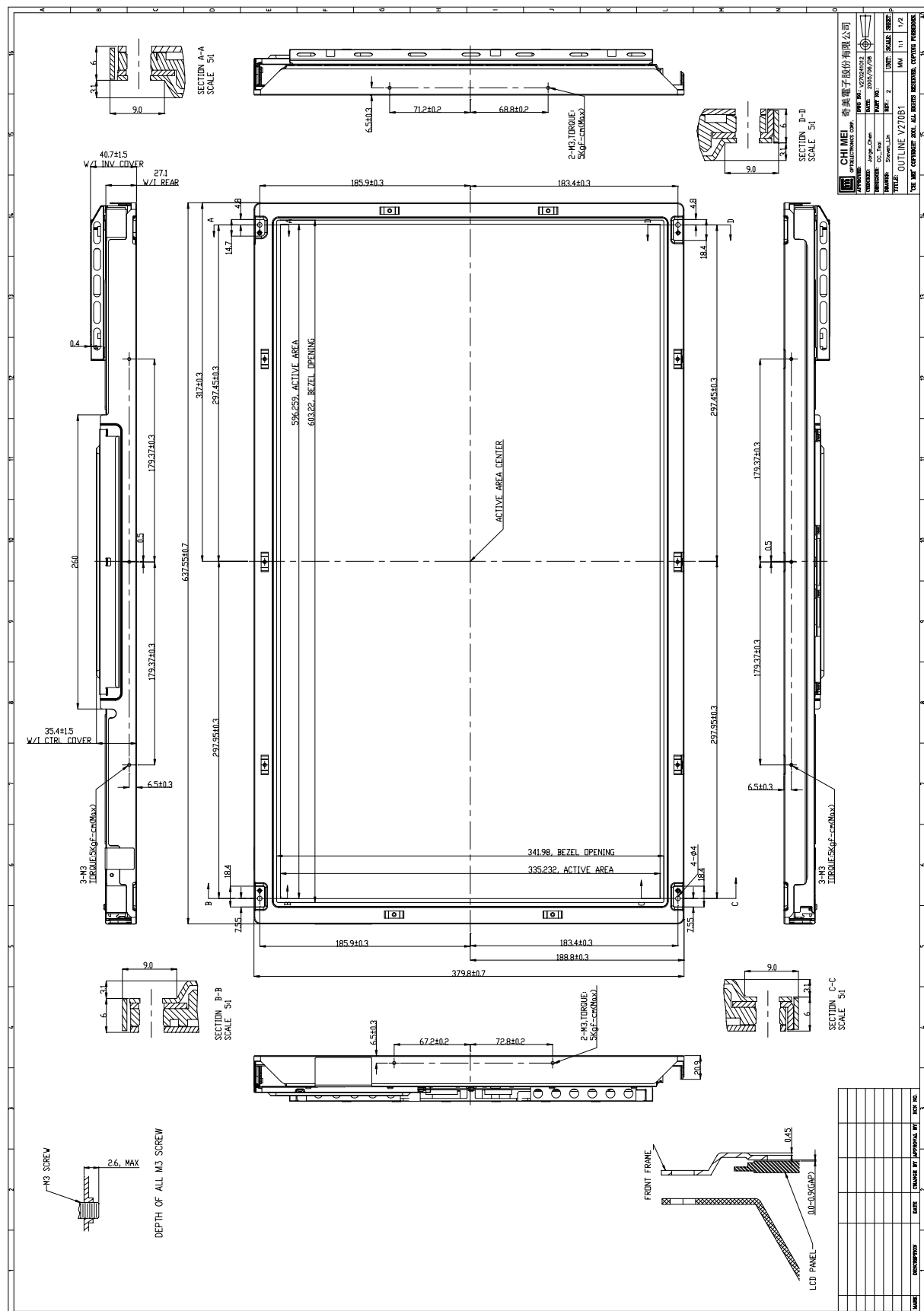
10.1 ASSEMBLY AND HANDLING PRECAUTIONS

- (1) Do not apply rough force such as bending or twisting to the module during assembly.
- (2) It is recommended to assemble or to install a module into the user's system in clean working areas.
The dust and oil may cause electrical short or worsen the polarizer.
- (3) Do not apply pressure or impulse to the module to prevent the damage of LCD panel and backlight.
- (4) Always follow the correct power-on sequence when the LCD module is turned on. This can prevent the damage and latch-up of the CMOS LSI chips.
- (5) Do not plug in or pull out the I/F connector while the module is in operation.
- (6) Do not disassemble the module.
- (7) Use a soft dry cloth without chemicals for cleaning, because the surface of polarizer is very soft and easily scratched.
- (8) Moisture can easily penetrate into LCD module and may cause the damage during operation.
- (9) High temperature or humidity may deteriorate the performance of LCD module. Please store LCD modules in the specified storage conditions.
- (10) When ambient temperature is lower than 10°C, the display quality might be reduced. For example, the response time will become slow, and the starting voltage of CCFL will be higher than that of room temperature.

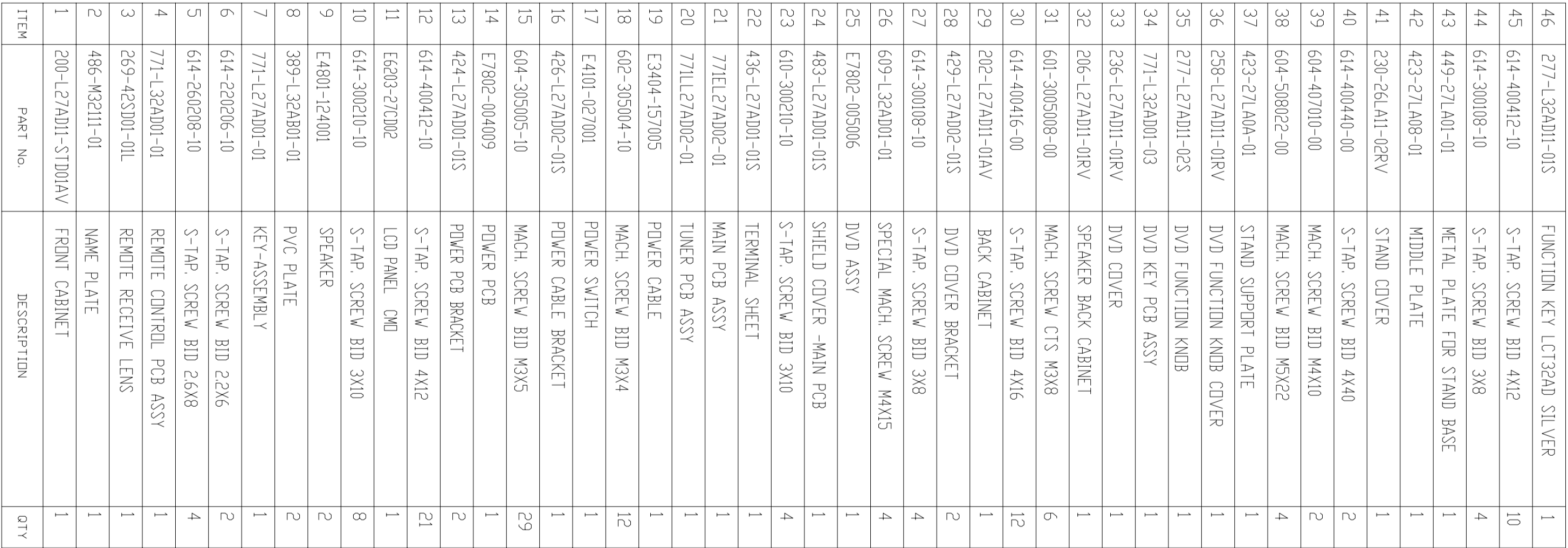
10.2 SAFETY PRECAUTIONS

- (1) The startup voltage of a backlight is over 1000 Volts. It may cause an electrical shock while assembling with the inverter. Do not disassemble the module or insert anything into the backlight unit.
- (2) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contact with hands, skin or clothes, it has to be washed away thoroughly with soap.
- (3) After the module's end of life, it is not harmful in case of normal operation and storage.

11. MECHANICAL CHARACTERISTICS







TOLERANCE UNLESS OTHERWISE SPECIFIED		KANA ELECTRONIC R & D CENTRE	TITLE EXIDE VIEW
0 - .38	± 0.10	MILL	MODEL NO. LG2701D
>.38-100	± 0.20		
>100	± 0.30		
FINISH	± 0.3*		
ANALYZE			
UNIT : mm			
SCALE 1:1		DWG. NO. LG2701EXP2	
		SHEET 1 OF 1	

Spare Part List for LCT2701TD

Item	Part Number	Part Description	Usage / unit	Unit
1	E6203-27CD02	DISPLAY LCD	1	piece
2	771EL27AD02-01	MAIN BOARD	1	set
3	771-L27AD02-01	TERMINAL PCBA	1	set
4	E7802-005006	DVD BOARD	1	piece
5	771LL27AD02-01	TUNER & AUDIO PCBA	1	set
6	E7802-004009	POWER BOARD PBA	1	set
7	771-L27AD01-01	KEY PCB ASSY	1	set
8	771-L32AD01-03	KEY PCB ASSY MICO DVD	1	set
9	771-L32AD01-01	REMOTE RECEIVE PCBA	1	set
10	E4101-027001	POWER SWITCH	1	piece
11	E4801-124001	SPEAKER	2	piece
12	E3471-000048	KEY WIRE FOR DVD	1	piece
13	E3471-000049	DVD SILGNAL WIRE	1	piece
14	E3461-064017	DVD POWER WIRE	1	piece
15	E3461-064019	TV+COMBO FOR DVD POWER WIRE	1	piece
16	E3421-925038	WIRE ASSY TJC3-2Y L=850MM SPK-L	3	piece
17	E3421-925053	WIRE ASSY FOR TV&DVD AUDIO L/R/MUTE	1	piece
18	E3421-925054	WIRE ASSY FOR TV&DVD TUNER	1	piece
19	E3471-002001	WIRE WS SHIELD WIRE FOR 27LCD TV+COMBO DVD SIGNAL WIRE	1	piece
20	E3421-925032	WIRE ASSY L=450MM	1	piece
21	E3421-229007	WIRE 3P	1	piece
22	E3471-000044	SHIELD WIRE FOR 32LCD COMBO MICO KEY 13P/8P+5P	1	piece
23	E3471-000046	SHIELD WIRE FOR MICO CMO(1366X768)	1	piece
24	E3461-064021	FLAT WIRE FOR 32LCD COMBO DVD BOARD +SV POWER	1	piece
25	E3461-064018	FLAF WIRE FOR TV+COMBO DVD STANDBY POWER WIRE	1	piece
26	E3471-000050	SHIELD WIRE FOR TV+COMBO DVD COAXIAL WIRE	1	piece
27	E3461-064016	FLAF WIRE FOR TV+COMBO INVERTER WIRE	1	piece
28	E3404-157005	AC CORD	1	piece
29	230-26LA11-01RV	STAND COVER	1	piece
30	200-L27AD11-STD01AV	CABINET FRONT SIL/BLK	1	piece
31	202-L27AD11-01AV	BACK CABINET BLACK	1	piece

Spare Part List for LCT2701TD

Item	Part Number	Part Description	Usage / unit	Unit
32	206-L27AD11-01RV	SPEAKER CABINET	1	piece
33	370-42D101-01	RUBBER FOOT	4	piece
34	E7301-010002	BATTERY AAA	2	piece
35	E7501-060001	REMOTE CONTROL	1	set
36	236-L27AD11-01RV	DVD COVER	1	piece
37	258-L27AD11-01RV	DVD FUNCTION KNOB COVER	1	piece
38	277-L32AD11-03S	FUNCTION KEY	1	piece
39	426-L27AD02-01S	POWER CABLE CLIP	1	piece
40	483-L27AD01-01S	SHIELD COVER-MAIN PCB	1	piece
41	436-L27AD01-01S	TERMINAL SHEET	1	piece
42	269-42SD01-01L	REMOTE LENS	1	piece
43	277-L27AD11-01S	DVD FUNCTION KNOB	1	piece
44	510-L27AD03-STU01K	CARTON BOX LCT2701TD	1	piece
45	300-L27AD06-02C	POLFOAM TOP	1	piece
46	300-L27AD05-02C	POLFOAM BOTTOM	1	piece
47	310-383550-07V	POLYBAG 38"X35"X0.5MM	1	piece
48	310-111404-07V	POLYBAG FOR INSTRUCTION MANUAL 11"X14"X0.04	1	piece
49	310-041104-01V	POLYBAG 4"X11"X0.04	1	piece
50	580-L27ADHS-TU01L	INSTRUCTION MANUAL	1	piece
51	579-L27AD09-01	CAUTION LABEL	1	piece
52	387-L32AB01-STU01H	MODEL PLATE	1	piece
53	590-L27AD01-03	WARRANTY CARD	1	piece
54	593-L27AD01-02	INSERTION CARD	1	piece
55	579-L27AD02-02	UPC LABEL OF G/B	2	piece
56	568-P46T02-02	WARNING LABEL	1	piece
57	579-L32AD04-01	LASER WARNING LABEL	1	piece
58	579-42D103-02	ON/OFF LB ENG	1	piece
59	579-42D102-09	SERIAL NO/BAR CODE LABEL	1	piece
60	579-L32AD03-02	CLASS I LASER PRODUCT LOGO	1	piece
61	579-42D105-01	PROTECTIVE EARTH LABE	1	piece

If you forget your V-Chip Password

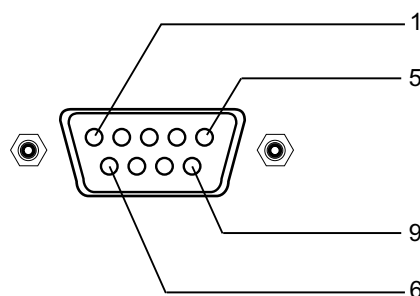
- Omnipotence V-Chip Password: **8205**.
- Press **MENU** button.
- Press **LEFT RIGHT** buttons to highlight "MISC" Menu.
- Press **Up, Down** buttons to highlight "Parental".
- Press **ENTER** button to pop up "Input your Password Please".
- Use the **Number buttons** (0~9) to enter an omnipotence Password.
- Press **ENTER** button to confirm and you can select "CHANGE PASSWORD".
- Suggest: Change to your familiar Password again.

Software upgrade

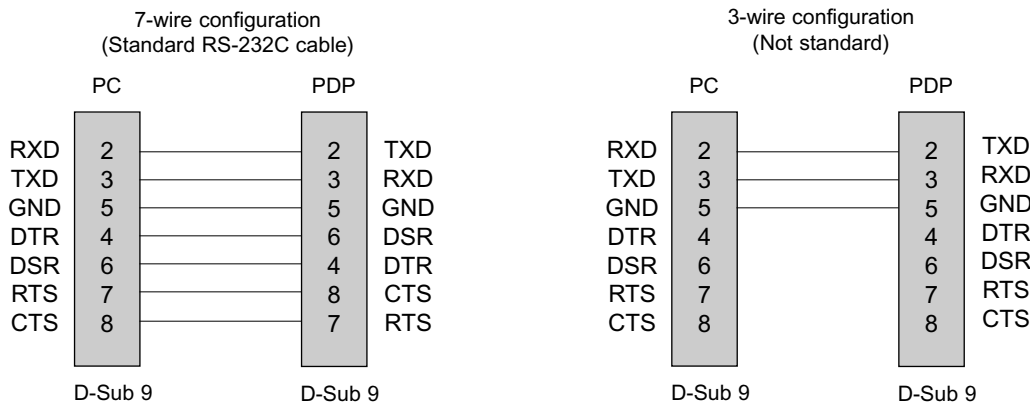
- Connect the RS-232C input jack to an external control device (such as a computer) and software upgrade.

Type of connector; D-Sub 9-pin male

No.	Pin name
1	No connection
2	RXD (Receive data)
3	TXD (Transmit data)
4	DTR (DTE side ready)
5	GND
6	DSR (DCE side ready)
7	RTS (Ready to send)
8	CTS (Clear to send)
9	No Connection



RS-232C configurations



Software upgrade Process

- Power Switch OFF.
- Connect the serial port of the control device to the RS-232 jack on the LCD-TV back panel.
RS-232C connection cables are not supplied with the LCD-TV.
- Power Switch ON. The power indicator on the front of the panel should now display red, means that the LCD-TV is in standby mode.
- Copy the software (MTKTOOL) to the computer.
- Open the software (MTKTOOL.EXE)
- Select MTK 8205 and Point "browse" on the interface of the MTKTOOL.exe.
- Select the file which will be update.
- Point "update" on the interface of the MTKTOOL.exe.
- Waiting for the upgrader programing, when it is finished, the bar will display 100%.
- After the upgrader is finished, shut down the power switch, take out the RS-232C connection after the power indicator is extinguished.

Note: After upgrading, the first time of power on will be some long.